# MELSEC System Q

## Programmable Logic Controllers

## User's Manual

# Process CPUs
# Q12PHCPU, Q25PHCPU

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MITSUBISHI ELECTRIC INDUSTRIAL AUTOMATION

# ● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.
These SAFETY PRECAUTIONS classify the safety precautions into two categories: "DANGER" and "CAUTION".

| | |
|---|---|
| ⚠ DANGER | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| ⚠ CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage. |

Depending on circumstances, procedures indicated by ⚠ CAUTION may also be linked to serious results.
In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

## [DESIGN PRECAUTIONS]

### ⚠ DANGER

● Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.

(1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.

(2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.
Note that the AnS series module will turn off the output in either of cases (a) and (b).
(a) The power supply module has over current protection equipment and over voltage protection equipment.
(b) The PLC CPUs self-diagnosis functions, such as the watch dog timer error, detect problems.
In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. See section 8.1 of this manual for example fail safe circuits.

(3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.

## [DESIGN PRECAUTIONS]

### ⚠ DANGER

- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.

- Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Not doing so could result in erroneous output or erroneous operation.

- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.
  Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.
  Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.
  In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

### ⚠ CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.

- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON.
  Take measures such as replacing the module with one having sufficient rated current.

## [INSTALLATION PRECAUTIONS]

### ⚠ CAUTION

- Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

- Hold down the module loading lever at the module bottom, and securely insert the module fixing latch into the fixing hole in the base unit. Incorrect loading of the module can cause a malfunction, failure or drop.
  When using the PLC in the environment of much vibration, tighten the module with a screw. Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

- When installing extension cables, be sure that the connectors of base unit are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.

- Securely load the memory card into the memory card loading connector. After loading, check for lifting. Lifting can cause a malfunction due to a contact fault.

- Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure.
  For details, refer to the section of online module change in this manual.

- Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.

## [WIRING PRECAUTIONS]

### ⚠ DANGER

- Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.

- When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock.

## [WIRING PRECAUTIONS]

### ⚠ CAUTION

- Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.

- When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.

- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.

- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.

- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.
  Do not peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### ⚠ DANGER

- Do not touch the terminals while power is on.
  Doing so could cause shock or erroneous operation.

- Correctly connect the battery. Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery. Mishandling of battery can cause overheating or cracks which could result in injury and fires.

- Switch all phases of the external power supply off when cleaning the module or retightening the terminal or module mounting screws. Not doing so could result in electric shock.
  Undertightening of terminal screws can cause a short circuit or malfunction. Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### ⚠ DANGER

- The online operations conducted for the CPU module being operated, connecting the peripheral device (especially, when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted. Operation mistakes could cause damage or problems with of the module.

- Do not disassemble or modify the modules.
  Doing so could cause trouble, erroneous operation, injury, or fire.

- Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away from the PLC.
  Not doing so can cause a malfunction.

- Switch all phases of the external power supply off before mounting or removing the module.
  If you do not switch off the external power supply, it will cause failure or malfunction of the module.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure.
  For details, refer to the section of online module change in this manual.

## [DISPOSAL PRECAUTIONS]

### ⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

REVISIONS

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INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-Q Series of General Purpose Programmable Controllers. Please read this manual carefully so that equipment is used to its optimum.

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About Manuals

The following manuals are related to this product.

Referring to this list, please request the necessary manuals.

Related Manuals

| Manual Name | Manual Number (Model Code) |
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| Process CPU User's Manual (Function Explanation, Program Fundamentals)<br>This manual explains the functions, programming methods, devices and so on necessary to create programs with the Process CPU. (Sold separately) | SH-080315E (13JR56) |
| QCPU (Q Mode)/QnA CPU Programming Manual (Common Instructions)<br>This manual describes how to use the sequence instructions, basic instructions and application instructions. (Sold separately) | SH-080039 (13JF58) |
| QCPU (Q Mode)/QnA CPU Programming Manual (SFC)<br>This manual explains the system configuration, performance specifications, functions, programming, debugging, error codes and others of MELSAP3. (Sold separately) | SH-080041 (13JF60) |
| QCPU (Q Mode)/QnA CPU Programming Manual (MELSAP-L)<br>This manual describes the programming methods, specifications, functions, and so on that are necessary to create the MELSAP-L type SFC programs. (Sold separately) | SH-080076 (13JF61) |
| QnPHCPU Programming Manual (Process Control Instructions)<br>This manual describes the programming procedures, device names, and other items necessary to implement PID control using process control instructions. (Sold separately) | SH-080316E (13JF67) |

How to Use This Manual

This manual is prepared for users to understand the hardware specifications of those modules such as the CPU modules, power supply modules, and base units, maintenance and inspections of the system, and troubleshooting required when you use MELSEC-Q series PLCs.

The manual is classified roughly into three sections as shown below.

1) Chapters 1 and 2 Describe the outline of the CPU module and the system configuration.
The basics of the system configuration of CPU module are described.

2) Chapters 3 to 7 Describe the general specifications indicating the operating environments of the CPU module, power supply module, and base units, and the performance specifications of these modules.

3) Chapters 8 to 10 Describe the overall maintenance such as the installation of the CPU module, daily inspections, and troubleshooting.

REMARK

This manual does not explain the functions of the CPU module.
For these functions, refer to the manual shown below.
• Process CPU User's Manual (Function Explanation, Program Fundamentals)


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About the Generic Terms and Abbreviations

This manual uses the following general names and abbreviations in the descriptions of the Process CPU unless otherwise specified.

| Generic Term/Abbreviation | Description |
|---|---|
| Process CPU | General name for Q12PHCPU, and Q25PHCPU modules. |
| Q Series | Abbreviation for Mitsubishi MELSEC-Q Series Programmable Logic Controller. |
| AnS Series | Abbreviation for small types of Mitsubishi MELSEC-A Series Programmable Logic Controller. |
| GX Developer | General name for GX Developer Version 7.10L or later. |
| Main base unit<br>Q3□B | General name for Q33B, Q35B, Q38B, Q312B type main base unit with Q Series power supply module, I/O module and intelligent function module attachable. |
| Extension base unit | General name for Q5□B and Q6□B. |
| Q5□B | General name for Q52B and Q55B type extension base unit with Q Series I/O module and intelligent function module attachable. |
| Q6□B | General name for Q63B, Q65B, Q68B and Q612B type extension base unit with Q Series power supply module, I/O module and intelligent function module attachable. |
| Base unit | General name for Main base unit and extension base unit. |
| SRAM card | Abbreviation for Q2MEM-1MBS, Q2MEM-2MBS types SRAM card. |
| Flash card | General name for Q2MEM-2MBF and Q2MEM-4MBF types Flash card. |
| ATA card | General name for Q2MEM-8MBA, Q2MEM-16MBA and Q2MEM-32MBA types ATA card. |
| Memory card | General name for SRAM card, Flash card and ATA card. |
| Power supply module | General name for Q61P-A1, Q61P-A2, Q62P, Q63P and Q64P types power supply module. |
| Battery | General name for battery for Q6BAT type CPU module and Q2MEM-BAT type SRAM card. |
| Extension cable | General name for QC05B, QC06B, QC12B, QC30B, QC50B, QC100B type extension cable. |

# 1. OVERVIEW



This User's Manual describes the hardware specifications and handling methods of the Process CPU.
The Manual also describes those items related to the specifications of the power supply module, main base unit, extension base unit, extension cable, memory card and battery.

The Process CPU is a process control-compatible CPU module.
Based on the High Performance model QCPU, the Process CPU has the following additional instructions and functions.

- Process control instructions: 52 instructions
- Auto tuning function
- Online module change
- MELSECNET/H multiplex remote I/O system compatibility

| POINT |
|---|
| (1) For details of the added instructions and auto tuning function, refer to the QnPHCPU Programming Manual (Process Control Instructions). |
| (2) For details of online module change, refer to Section 4.6 of this manual. |

## 1.1 Features



Process CPU has the following new features:

(1) 52 instructions added as process control instructions
52 additional instructions are capable of high-level process control.

(2) 2-degree-of-freedom PID control system
The 2-degree-of-freedom PID control system adopted enables optimum response to both set value variation and disturbance variation.

(3) Addition of auto tuning function (PID constant initial value setting)
The auto tuning function automates control parameter adjustment, shortens adjustment, saves the labor of operators and control engineers, and resolves differences in adjustment results between individuals.

(4) Module can be changed online (online module change)
When a module fails, you can change it without stopping the system.
Online module change applies to the Q series I/O modules and to the A/D converter, D/A converter, thermocouple input and temperature control modules of function version C and later.

(5) Multiplex remote I/O system of MELSECNET/H can be configured
By mounting the remote master station of the MELSECNET/H, you can configure the multiplex remote I/O system of the MELSECNET/H.

| POINT |
|---|
| (1) For details of the added instructions and auto tuning function, refer to the QnPHCPU Programming Manual (Process Control Instructions). |
| (2) For details of online module change, refer to Section 4.6 of this manual. |
| (3) Use the Process CPU of GX Developer Version 7.10L or later. |

### (6) Controllable multiple I/O points

All Process CPUs support 4096 points (X/Y0 to FFF) as the number of actual I/O points capable of getting access to the I/O module installed on the base unit. They also support 8192 points max. (X/YO to 1FFF) as the number of I/O devices which can be used in the remote I/O stations such as MELSECNET/H remote I/O NET and CC-Link data link.

### (7) Lineup according to program capacity

The optimum CPU module for the program capacity to be used can be selected.
Q12PHCPU : 124k step
Q25PHCPU : 252k step

### (8) Realised high speed processing

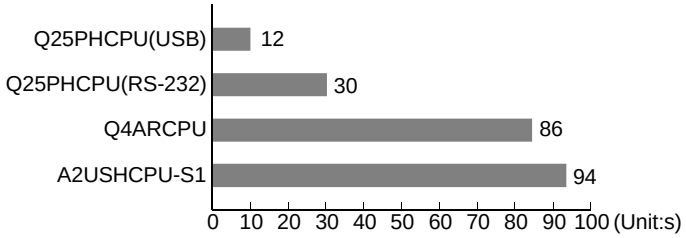
Depending on the type of the sequencer, high speed processing has been realized.(Example: when LD instruction is used)
Q12PHCPU, Q25PHCPU : 0.034μs

In addition, an access to the intelligent function module or an increase in speed of the link refresh of the network have been realized by the connection system (System bus connection) of the newly developed base unit.
Access to the intelligent function module : 20μs /word (approx. 7 times)*1
MELSECNET/H link refresh processing : 4.6ms/8k word (approx. 4.3 times)*1
*1: Where Q25PHCPU is compared with Q4ARCPU.

### (9) Increase in debugging efficiency through high speed communication with GX Developer

In the Process CPU, a time required for writing/reading of a program or monitoring has been reduced through the high speed communication at a speed of 115.2kbps max. by the RS-232, and a communication time efficiency at the time of debugging has been increased.
In the Process CPU, a high speed communication at a speed of 12Mbps is allowed through the USB.

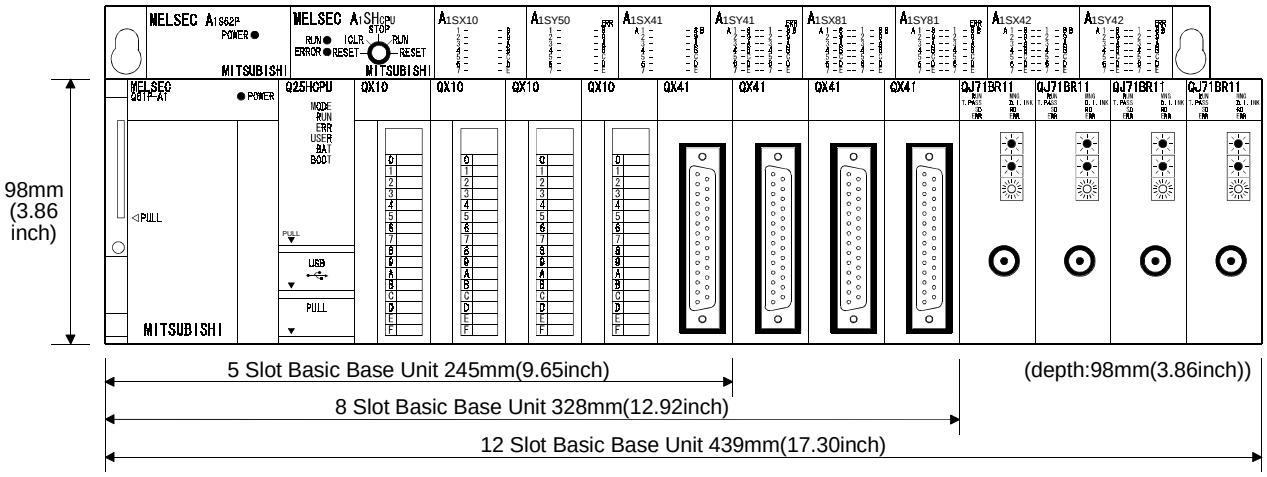
26k step program transfer time



### (10) Saved space by a reduction in size

The installation space for Q series has been reduced by approx. 60 % of the space for AnS series.

Comparison of installation space




### (11) Connection of up to seven extension base units.

(a) The Process CPU can connect to seven extension base units (eight base units including the main) and accept up to 64 modules.

(b) The overall distance of the extension cables is up to 13.2m to ensure high degree of extension base unit arrangement.

### (12) Memory extension by memory card

The Process CPU is provided with a memory card installation connector to which a memory card of 32 Mbyte max. can be connected (32 Mbyte is available when a ATA card is used).

When a memory card of large capacity is installed, a large capacity of file can be controlled, comments to all data devices can be set up, and the programs in the past can be stored in the memory as they are in the form of the corrected histories.

If a memory card is not installed, a program can be stored onto the standard ROM built in the CPU module, and 128k points of the file registers can be handled by the standard RAM.

### (13) Data can be written automatically to standard ROM

You need not use GX Developer to write parameters/programs on a memory card to the standard ROM of the Process CPU.
When the standard ROM is used to perform ROM operation, you can load a memory card into the Process CPU and write parameters/programs on the memory card to the standard ROM. Hence, you need not carry GX Developer (personal computer) to rewrite the parameters/programs.

### (14) External I/O can be turned ON/OFF forcibly

If the Process CPU is in the RUN mode, you can operate GX Developer to turn external inputs/outputs ON/OFF forcibly, independently of the program execution status.
You need not put the Process CPU in the STOP mode to perform wiring/operation tests by forced ON/OFF of outputs.

### (15) Remote password can be set

When access to an Ethernet module or serial communication module is made externally, whether access to the Process CPU can be made or not can be selected with a remote password.

### (16) Remote I/O network of MELSECNET/H can be configured

You can load the remote master station of the MELSECNET/H to configure an MELSECNET/H remote I/O system.

REMARK

- In addition to the remote password, there are the following protection facilities for the Process CPU.
  Protection of the whole CPU module by making system settings of the Process CPU
  Protection of the memory card by setting the write protect switch of the memory card
  File-by-file protection using password

# 2. SYSTEM CONFIGURATION FOR SINGLE CPU SYSTEM

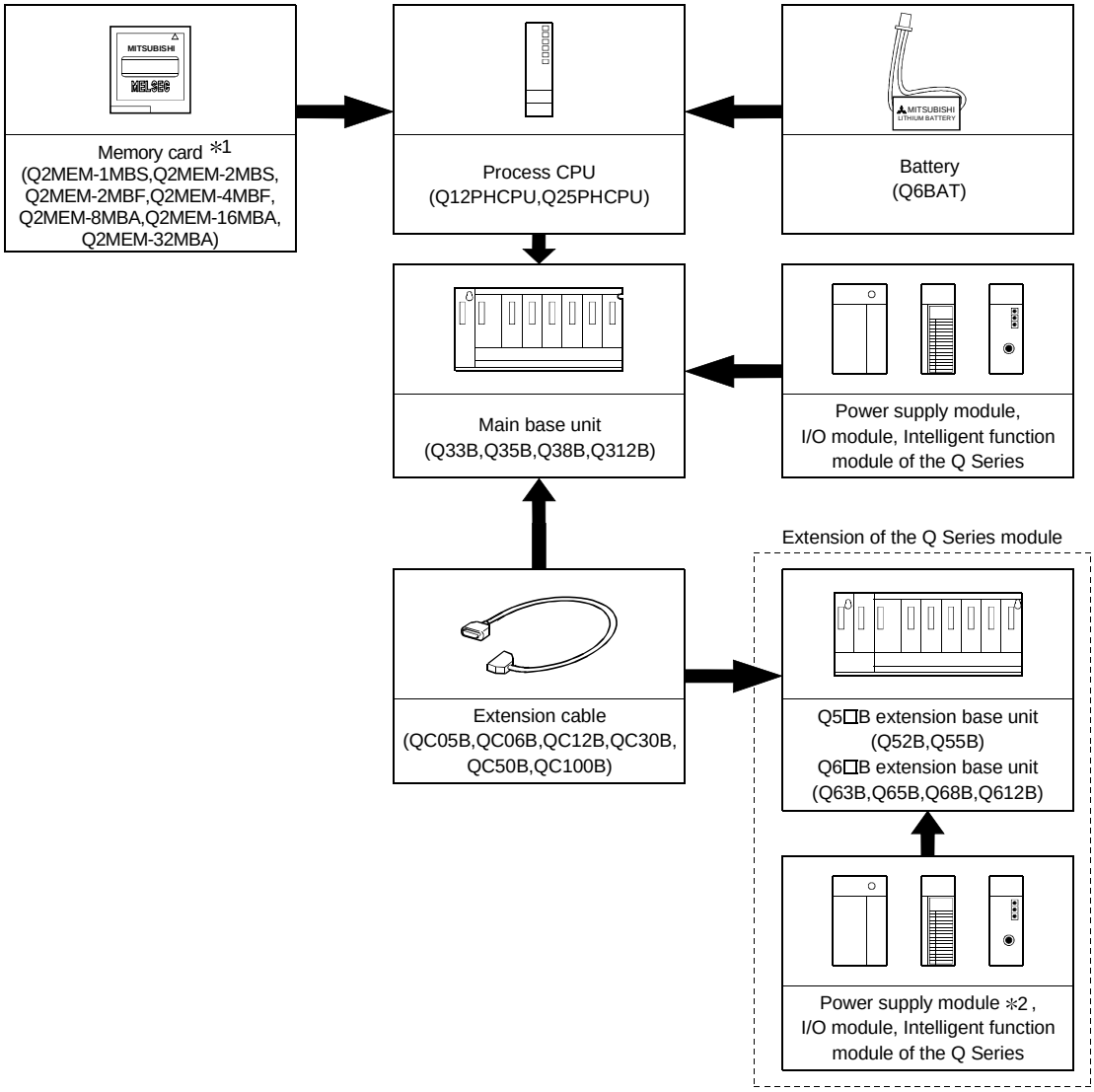
This section describes the system configuration of the Process CPU, cautions on use of the system, and configured equipment.

## 2.1 System Configuration



The outline of the equipment configuration, configuration with peripheral devices, and system configuration in the Process CPU system is described below.

### (1) Equipment configuration

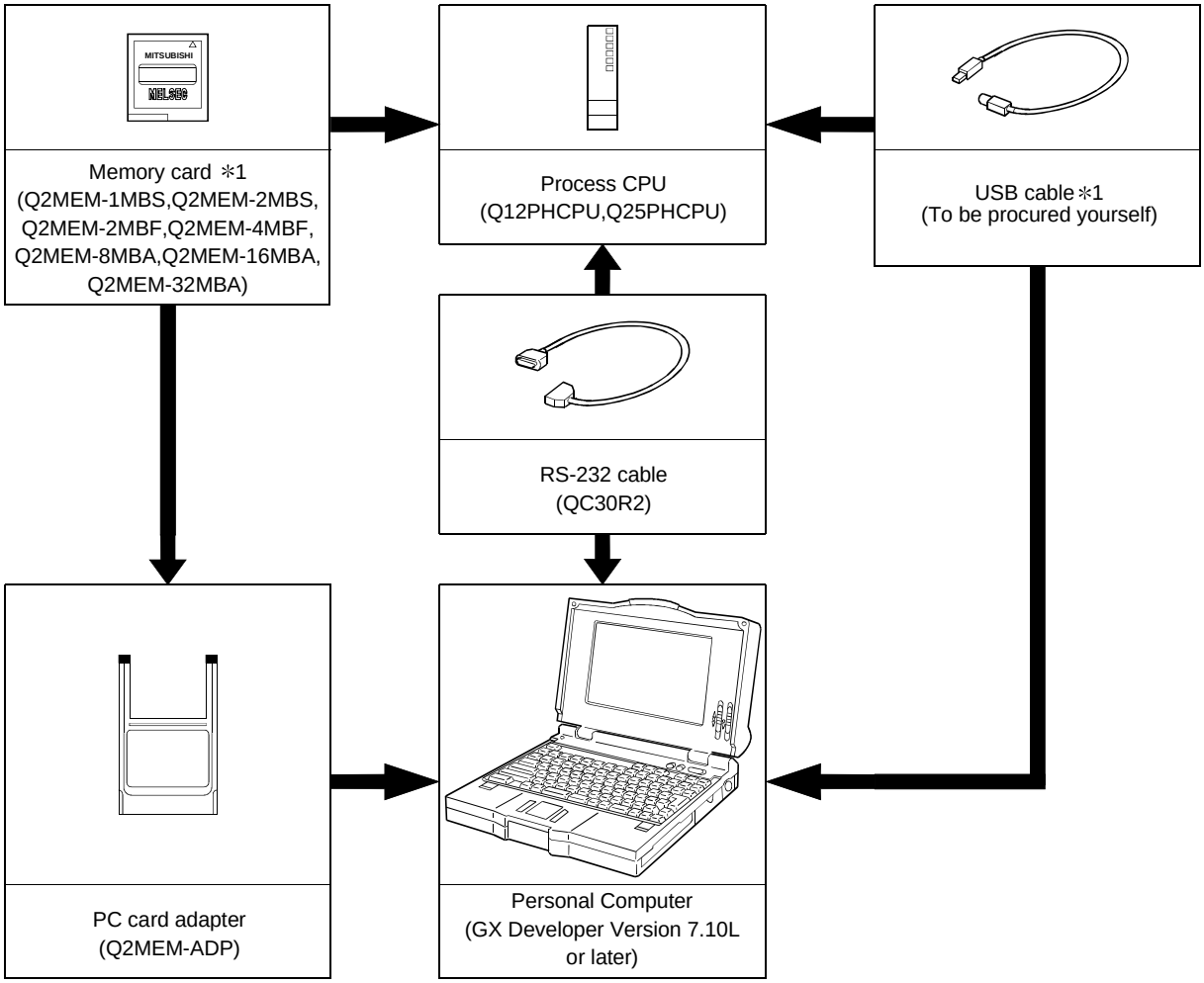



**POINTS**

*1: The number of memory cards to be installed is one sheet.
The memory card must be selected from SRAM, Flash, and ATA according to the application and capacity.
With commercial memory cards, the Operation is not assured.

*2: The Q series power supply module is not required for the Q5□B type extension base unit.

(2) Configuration of peripheral devices




∗1: For writing into memory card on GX Developer, and USB cable, refer to the operating manual of the GX Developer.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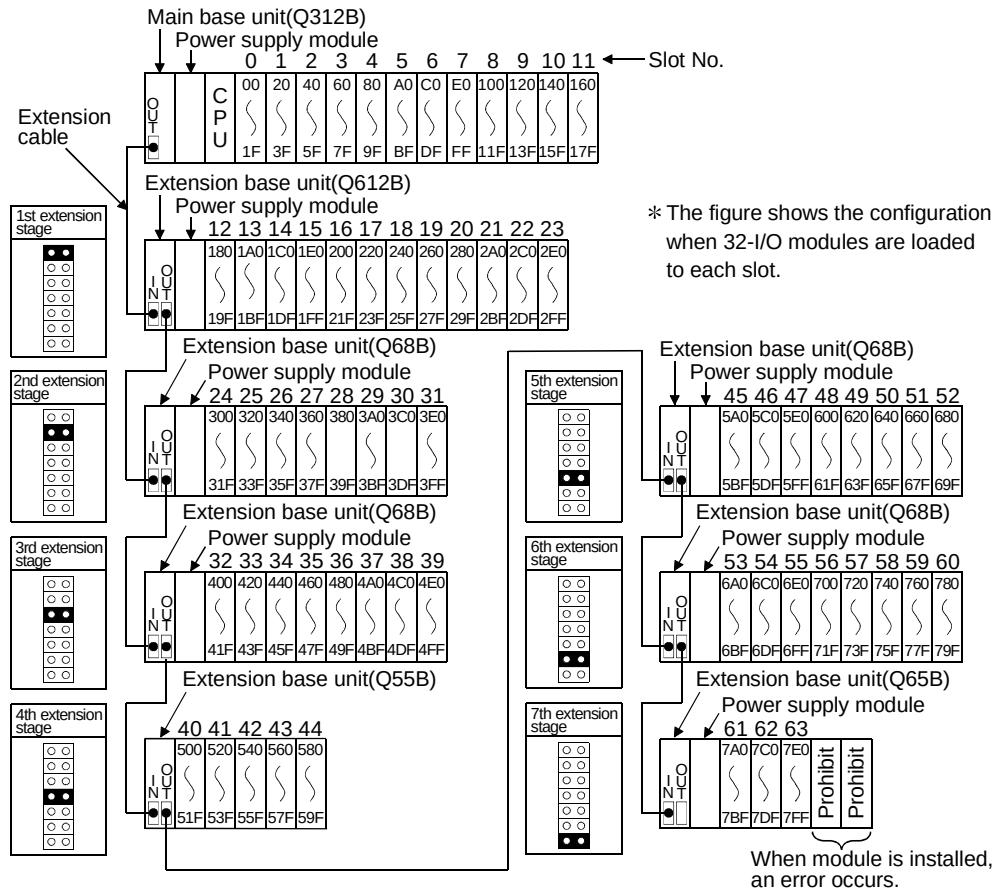
## (3) Outline of system configuration

| | |
|---|---|
| System configuration |  |
| Maximum number of Extension Stages | Seven Extension Stages |
| Maximum number of I/O modules to be installed | 64 modules |
| Maximum number of occupied I/O points | 4096 |
| Main base unit | Q33B, Q35B, Q38B, Q312B |
| Extension base unit | Q52B, Q55B, Q63B, Q65B, Q68B, Q612B |
| Extension cable | QC05B, QC06B, QC12B, QC30B, QC50B, QC100B |
| Notes | (1) Extension bases unit of up to seven stages can be used.<br>(2) Do not use extension cable longer than an overall extension length of 13.2m(43.31ft.).<br>(3) When using an extension cable, do not bind it together with the main circuit (high voltage and heavy current) line or do not lay down them closely to each other.<br>(4) When setting the No. of the expansion stages, set it in the ascending order so that the same No. is not set simultaneously by two extension base units.<br>(5) Although there are no particular restrictions in the order of the installation of the Q5□B and Q6□B, refer to Section 6.6 for usability.<br>(6) Connect the extension cable from OUT of the extension cable connector of the base unit to IN of the extension base unit on the next stage.<br>(7) If 65 or more modules are installed, an error will occur. |

## 2.2 Precaution on System Configuration

This section describes hardware and software packages compatible with Process CPU.

### (1) Hardware

(a) The Process CPU can be used with the MELSEC-Q series I/O and intelligent function modules.
It cannot be used with the MELSEC-AnS/Q2AS series I/O and special function modules.

(b) The number of modules to be installed and functions are limited depending on the type of the modules.

| Applicable Module | Type | Limit of number of modules to be installed |
|---|---|---|
| Q Series MELSECNET/10H network module | • QJ71LP21<br>• QJ71BR11<br>• QJ71LP21-25<br>• QJ71LP21G<br>• QJ71LP21GE | Up to 4 units |
| Q series Ethernet interface module | • QJ71E71<br>• QJ71E71-B2<br>• QJ71E71-100 | Up to 4 units |
| Q series CC-Link system master local module | • QJ61BT11 | No limit* |
| Interrupt module | • QI60 | One unit only |

*: A maximum of 4 modules if the network parameters for CC-Link are set and controlled by the GX Developer. There is no restriction in the number of modules when the parameters are set by the special-purpose instructions for the CC-Link. For details on the CC-Link System Master Local Unit that can set parameters with the special-purpose instructions, refer to the manual for the CC-Link Master Local module.

(c) A graphic operation terminal can be used only for the GOT900 series (Basic OS matching Q mode and communication driver must be installed).
The GOT800 series, A77GOT, and A64GOT cannot be used.

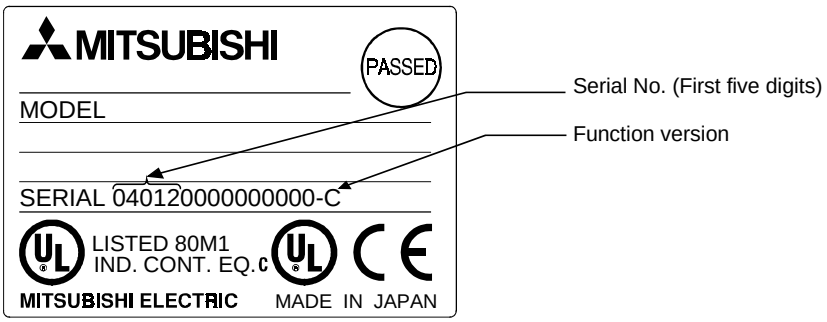
### (2) Software package

You can use GX Developer Version 7.10L or later to create the programs of the Process CPU.
Do not use GX Developer Version 7.09K or earlier.

## 2.3 Confirming the Serial Number and Function Version

The CPU module serial No. can be confirmed on the rated plate and GX Developer's system monitor.

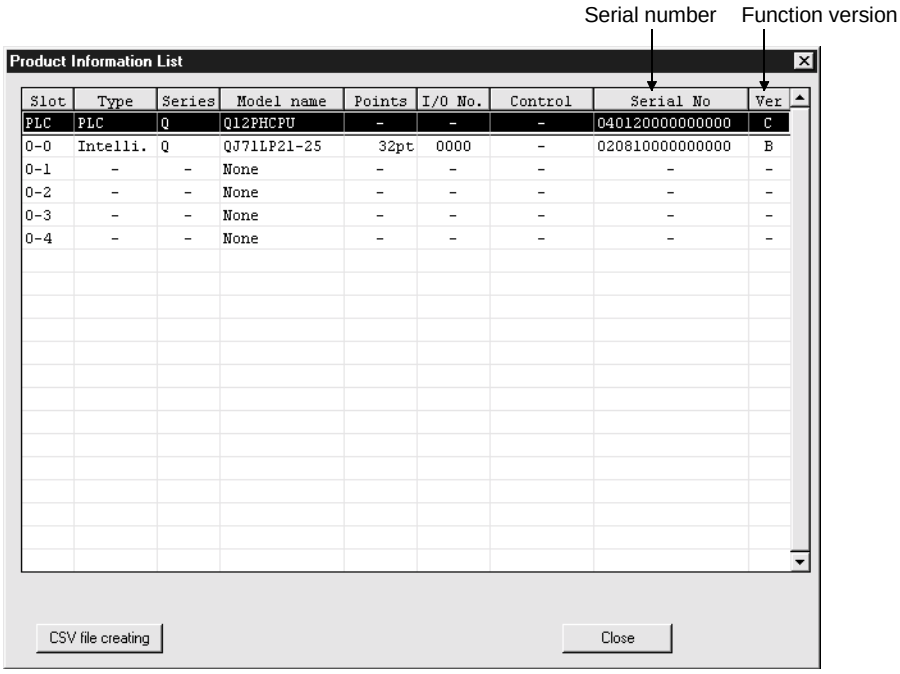
(1) Confirming the serial No. on the rated plate




(2) Confirming the serial No. on the system monitor (list of product information)

The CPU module serial No. and function version can be confirmed with the list of product information on the GX Developer system monitor.

Serial Nos. and function versions of the intelligent function module and CPU module can also be confirmed.


Serial number
Function version
Product Information List
Slot | Type | Series | Model name | Points | I/O No. | Control | Serial No | Ver
PLC | PLC | Q | Q12PHCPU | - | - | - | 040120000000000 | C
0-0 | Intelli. | Q | QJ71LP21-25 | 32pt | 0000 | - | 020810000000000 | B
0-1 | - | - | None | - | - | - | - | -
0-2 | - | - | None | - | - | - | - | -
0-3 | - | - | None | - | - | - | - | -
0-4 | - | - | None | - | - | - | - | -
CSV file creating
Close

# 3. GENERAL SPECIFICATIONS

Performance specification of PLC is as follows:

| Item | Specifications | | | | | |
|---|---|---|---|---|---|---|
| Operating ambient temperature | 0 to 55°C | | | | | |
| Storage ambient temperature | -25 to 75°C | | | | | |
| Operating ambient humidity | 5 to 95%RH, non-condensing | | | | | |
| Storage ambient humidity | 5 to 95%RH, non-condensing | | | | | |
| Vibration resistance | Conforming to JIS B 3502, IEC 61131-2 | | Frequency | Acceleration | Amplitude | Sweep count |
| | | Under intermittent vibration | 10 to 57Hz | ——— | 0.075mm (0.003inch) | 10 times each in X, Y, Z directions (for 80 min.) |
| | | | 57 to 150Hz | 9.8m/s$^2$ | ——— | |
| | | Under continuous vibration | 10 to 57Hz | ——— | 0.035mm (0.001inch) | |
| | | | 57 to 150Hz | 4.9m/s$^2$ | ——— | |
| Shock resistance | Conforming to JIS B 3501, IEC 61131-2 (147 m/s$^2$, 3 times in each of 3 directions X, Y, Z) | | | | | |
| Operating ambience | No corrosive gases | | | | | |
| Operating altitude | 2000m (6562ft.) max. | | | | | |
| Installation location | Inside control panel | | | | | |
| Overvoltage category ＊1 | II max. | | | | | |
| Pollution level ＊2 | 2 max. | | | | | |

＊1 : This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities.
The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

＊2 : This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

＊3 : Do not use or store the PLC under pressure higher than the atmospheric pressure of altitude 0m. Doing so can cause a malfunction.
When using the PLC under pressure, please contact your sales representative.

# MEMO




3 - 2

# 4. HARDWARE SPECIFICATION OF THE CPU MODULE

## 4.1 Performance Specification

The table below shows the performance specifications of the CPU module.

Performance Specifications

| Item | | | Model | | Remark |
|---|---|---|---|---|---|
| | | | Q12PHCPU | Q25PHCPU | |
| Control method | | | Repetitive operation of stored program | | |
| I/O control mode | | | Refresh mode | | Direct I/O is possible by direct I/O specification (DX□, DY□) |
| Programming language (Sequence control dedicated language) | | | Relay symbol language, logic symbolic language, MELSAP3 (SFC), MELSAP-L, Function block | | |
| Processing speed (Sequence instruction) | LD X0 | | 0.034 μs | | |
| | MOV D0 D1 | | 0.102 μs | | |
| Total number of instructions | | | 415 (excluding intelligent function module dedicated instructions) | | |
| Constant scan (ms) (Function for setting the scan timer to fixed settings) | | | 0.5 to 2000 (configurable in increments of 0.5 ms) | | Set parameter values to specify |
| Program ✻2 capacity | Program memory (Drive 0) | | 124k step | 252k step | |
| Memory capacity | Memory card (RAM) (Drive 1) | | Capacity of loading memory cards(2Mbyte max.) | | For memory capacity, see Section 7.1. |
| | Memory card (ROM) (Drive 2) | | Installed memory card capacity (Flash card: 4 Mbyte max., ATA card: 32 Mbyte max.) | | For memory capacity, see Section 7.1. |
| | Standard RAM (Drive 3) | | 256kbyte | | |
| | Standard ROM (Drive 4) | | 496 kbyte | 1008 kbyte | |
| | CPU shared memory ✻3 | | 8 kbyte | | |
| Maximum number of stored files | Program memory | | 124 | 252 ✻1 | |
| | Memory card (RAM) | | 256 | | |
| | Memory card (ROM) | Flash card | 288 | | |
| | | ATA card | 512 | | |
| | Standard RAM | | 2 | | Only one file register and one local device |
| | Standard ROM | | 124 | 252 | |
| Standard ROM number of writings | | | Max. 100000 times | | |

✻1:124 is the maximum number of programs that can be executed on Process CPU.

✻2:The maximum number of sequence steps (for one program) for which the parameters are stored in another drive and executed with the Process CPU can be calculated with the following expression.
(Program size) - (File header size (default: 34 steps))
Refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals) for details on the program size and file.

✻3:The CPU shared memory is not latched. The CPU shared memory is cleared when the power is turned on to the PLC or when the CPU module is reset.

## Performance Specifications (continued)

| Item | | | Model | | Remark |
|---|---|---|---|---|---|
| | | | Q12PHCPU | Q25PHCPU | |
| Number of I/O devices points | | | 8192 points (X/Y0 to 1FFF) | | Number of devices usable on program |
| Number of occupied I/O points | | | 4096 points (X/Y0 to FFF) | | Number of points accesible to actual I/O modules |
| Number of device points | Internal relay [M] | | Default 8192 points (M0 to 8191) | | Number of use points is set with parameters. |
| | Latch relay [L] | | Default 8192 points (L0 to 8191) | | |
| | Link relay [B] | | Default 8192points (B0 to 1FFF) | | |
| | Timer [T] | | Default 2048 points (T0 to 2047) (for low / high speed timer)<br>Select between low / high speed timer by instructions.<br>The measurement unit of the low / high speed timer is set with parameters.<br>(Low speed timer : 1 to 1000ms, 1ms/unit, default 100ms)<br>(High speed timer : 0.1 to 100ms, 0.1ms/unit, default 10ms) | | |
| | Retentive timer [ST] | | Default 0 point(for low / high speed retentive timer)<br>Switchover between the low / high speed retentive timer is set by instructions.<br>The measurement unit of the low / high speed retentive timer is set with parameters.<br>(Low speed retentive timer : 1 to 1000ms, 1ms/unit, default 100ms)<br>(High speed retentive timer : 0.1 to 100ms, 0.1ms/unit, default 10ms) | | |
| | Counter [C] | | • Normal counter default 1024 points (C0 to 1023)<br>• Interrupt counter maximum 256 points<br>(default 0 point, set with parameters) | | |
| | Data register [D] | | Default 12288 points (D0 to 12287) | | |
| | Link register [W] | | Default 8192 points (W0 to 1FFF) | | |
| | Annunciator [F] | | Default 2048 points (F0 to 2047) | | |
| | Edge relay [V] | | Default 2048 points (V0 to 2047) | | |
| | File register | [R] | • When a standard RAM is used:<br>The number of points of up to 131072 points can be used by block conversion in increments of 32768 points (R0 to 32767).<br>• When a SRAM card (1Mbyte) is used:<br>The number of points of up to 517120 points can be used by block conversion in increments of 32768 points (R0 to 32767).<br>• When a SRAM card (2Mbyte) is used:<br>The number of points of up to 1041408 points can be used by block conversion in increments of 32768 points (R0 to 32767).<br>• When a Flash card (2Mbyte) is used:<br>The number of points of up to 1041408 points can be used by block conversion in increments of 32768 points (R0 to 32767).<br>• When a Flash card (4Mbyte) is used:<br>The number of points of up to 1042432 points can be used by block conversion in increments of 32768 points (R0 to 32767). | | When a Flash card is used, read only is possible.<br>The ATA card cannot be used. |
| | | [ZR] | • When a standard RAM is used:<br>131072 points (ZR0 to 131071), No block conversion necessary.<br>• When a SRAM card (1Mbyte) is used:<br>517120 points (ZR0 to 517119), No block conversion necessary.<br>• When a SRAM card (2Mbyte) is used:<br>1041408 points (ZR0 to 1041407), No block conversion necessary.<br>• When a Flash card (2Mbyte) is used:<br>1041408 points (ZR0 to 1041407), No block conversion necessary.<br>• When a Flash card (4Mbyte) is used:<br>1042432 points (ZR0 to 1042431), No block conversion necessary. | | |




4 - 2

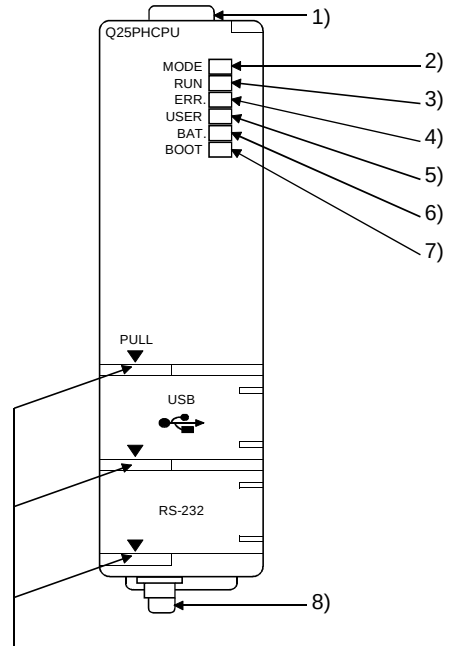
## Performance Specifications (continued)

| Item | | | Model | | Remark |
|---|---|---|---|---|---|
| | | | Q12PHCPU | Q25PHCPU | |
| Number of device points | Special link relay [SB] | | 2048 points (SB0 to 7FF) | | The number of device points is fixed. |
| | Special link register [SW] | | 2048 points (SW0 to 7FF) | | |
| | Step relay [S] | | 8192 points (S0 to 8191) | | |
| | Index register [Z] | | 16 points (Z0 to 15) | | |
| | Pointer [P] | | 4096 points (P0 to 4095), set parameter values to select usable range of in-file pointer / shared pointers. | | |
| | Interrupt pointer [ I ] | | 256 points (I0 to 255)<br>The specified intervals of the system interrupt pointers I28 to I31 can be set with parameters.(0.5 to 1000ms, 0.5 ms/unit)<br>Default I28 : 100ms I29 : 40ms I30 : 20ms I31 : 10ms | | |
| | Special relay [SM] | | 2048 points (SM0 to 2047) | | |
| | Special register [SD] | | 2048 points (SD0 to 2047) | | |
| | Function input [FX] | | 16 points (FX0 to F) | | |
| | Function output [FY] | | 16 points (FY0 to F) | | |
| | Function register[FD] | | 5 points (FD0 to 4) | | |
| Link direct device | | | Device having a direct access to link device.<br>MELSECNET/10(H) use only.<br>Specified form : J□□\X□□, J□□\Y□□, J□□\W□□,<br>J□□\B□□, J□□\SW□□, J□□\SB□□ | | |
| Intelligent function module device | | | Device having a direct access to the buffer memory of the intelligent function module. Specified form : U□□\G□□ | | |
| Latch (power failure compensation) range | | | L0 to 8191 (default)<br>(Latch range can be set for B, F, V, T, ST, C, D, and W.) | | Set parameter values to specify |
| Remote RUN/PAUSE contact | | | RUN and PAUSE contacts can be set from among X0 to 1FFF, respectively. | | |
| Clock function | | | Year, month, day, hour, minute, second, day of the week<br>(leap year automatic distinction)<br>Accuracy -3.18 to +5.25s (TYP. +2.12s) /d at 0°C<br>Accuracy -3.93 to +5.25s(TYP. +1.90s)/d at 25°C<br>Accuracy -14.69 to +3.53s(TYP. -3.67s)/d at 55°C | | |
| Allowable momentary power failure period | | | Varies according to the type of power supply module. | | |
| 5VDC internal current consumption | | | 0.64A | | |
| Weight | | | 0.20kg | | |
| External dimensions | | H | 98mm (3.86inch) | | |
| | | W | 27.4mm (1.08inch) | | |
| | | D | 89.3mm (3.52inch) | | |

## 4.2 Part Names and Settings

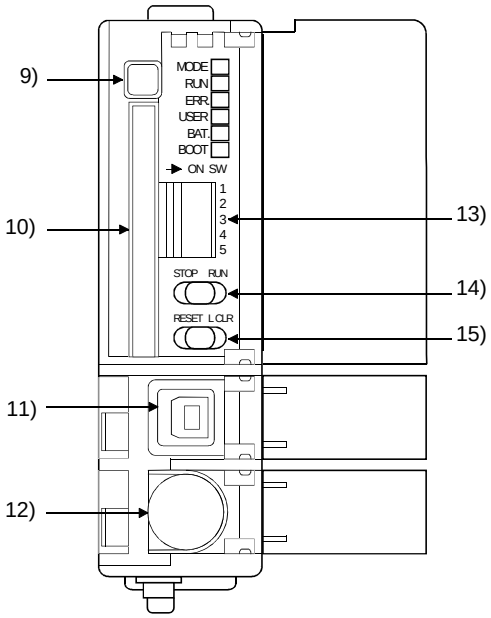
This section explains the part names and settings of the module.

Front face

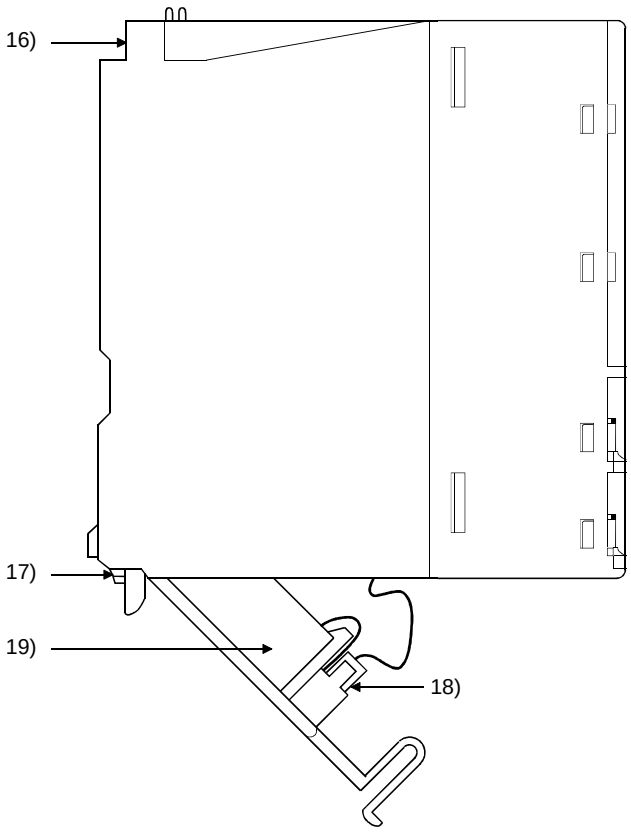



When opening the front cover, put your finger here.

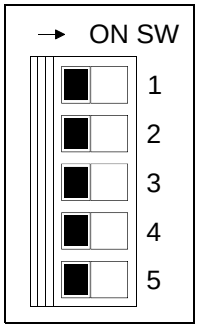
With front cover open



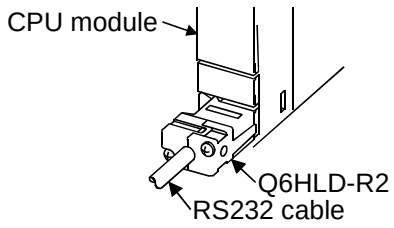

Side face



| No. | Name | Application |
|---|---|---|
| 1) | Module fixing hook | Hook used to fix the module to the base unit. (Single-motion installation) |
| 2) | "Mode" LED | Indicates the mode of the CPU module.<br>ON (green) : Q mode<br>Flicker (green) : Enforced ON/OFF for external I/O registered |
| 3) | "RUN" LED | Indicates the operating status of the CPU module.<br>ON : During operation in "RUN" status.<br>OFF : During a stop in "STOP" status or detection of error whose occurrence stops operation.<br>Flicker : When parameter/program is written at STOP and RUN/STOP switch is changed from "STOP" to "RUN".<br>To turn ON the RUN LED after writing the program, carry out the following steps.<br>• Set the RUN/STOP switch from "RUN" → "STOP" → "RUN".<br>• Reset with the RESET/L.CLR switch.<br>• Restart the PLC power.<br>To turn ON the RUN LED after writing the parameters, carry out the following steps.<br>• Reset with the RESET/L.CLR switch.<br>• Restart the PLC power.<br>(If the RUN/STOP switch is set from "RUN" → "STOP" → "RUN" after changing the parameters, the parameters related to the intelligent function module, such as the network parameters, will not be reflected.) |
| 4) | "ERR." LED | ON : Detection of self-diagnostic error which will not stop operation, except battery error.<br>(When operation continued at error detection is set in the parameter)<br>OFF : Normal<br>Flicker : Detection of error whose occurrence stops operation.<br>When automatic write to standard ROM is completed normally. ("BOOT" LED also flickers.) |
| 5) | "USER" LED | ON : Error detected by CHK instruction or annunciator ON<br>OFF : Normal<br>Flicker : Execution of latch clear |
| 6) | "BAT." LED | ON : Occurrence of battery error due to reduction in battery voltages of CPU module or memory card.<br>OFF : Normal |
| 7) | "BOOT" LED | ON : Start of boot operation<br>OFF : Non-execution of boot operation<br>Flicker : When automatic write to standard ROM is completed normally. ("ERR." LED also flickers.) |
| 8) | Module loading lever | Used to load the module to the base unit. |

<table>
<tr><th>No.</th><th>Name</th><th>Application</th></tr>
<tr><td>9)</td><td>Memory card EJECT button</td><td>Used to eject the memory card from the CPU module.</td></tr>
<tr><td>10)</td><td>Memory card loading connector</td><td>Connector used to load the memory card to the CPU module.</td></tr>
<tr><td>11)</td><td>USB connector ∗1</td><td>Connector for connection with USB-compatible peripheral device. (Connector type B)<br>Can be connected by USB-dedicated cable.</td></tr>
<tr><td>12)</td><td>RS-232 connector ∗1</td><td>Connector for RS-232 connection<br>Can be connected by RS-232 connection cable (QC30R2).</td></tr>
<tr><td rowspan="4">13)</td><td rowspan="4">DIP switches<br> 
</td><td>Used to set the items for operation of the CPU module.<br>For system protection and parameter-valid drive functions, refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).</td></tr>
<tr><td>SW1 : Used to set system protection. Batch-inhibits write and control directives to the CPU module. (Shipped in OFF position)<br>OFF : No protection<br>ON : Protection</td></tr>
<tr><td>SW2, SW3: Used to specify parameter-valid drive.<br>(Both SW2 and SW3 are shipped in OFF position)
<table>
<tr><th>SW2</th><th>SW3</th><th>Parameter Drive</th></tr>
<tr><td>OFF</td><td>OFF</td><td>Program memory (Drive 0)</td></tr>
<tr><td>ON</td><td>OFF</td><td>SRAM card (Drive 1)</td></tr>
<tr><td>OFF</td><td>ON</td><td>Flash card/ATA card (Drive 2)</td></tr>
<tr><td>ON</td><td>ON</td><td>Standard ROM (Drive 4)</td></tr>
</table>
Note: Parameters cannot be stored in standard RAM (Drive 3).</td></tr>
<tr><td>SW4 : Must not be used. Normally OFF. (Shipped in OFF position)</td></tr>
<tr><td>SW5 : Must not be used. Normally OFF. (Shipped in OFF position)</td></tr>
<tr><td>14)</td><td>RUN/STOP switch</td><td>RUN : Executes sequence program operation.<br>STOP : Stops sequence program operation.</td></tr>
<tr><td>15)</td><td>RESET/L.CLR switch</td><td>RESET : Used to perform hardware reset, operation fault rest, operation initialization, etc.<br>If this switch is left in the RESET position, the whole system will be reset and the system will not operate properly. After performing reset, always return this switch to the neutral position.<br>L.CLR : Used to turn "OFF" or "zero" all data in the parameter-set latch area.<br>Used to clear the sampling trace and status latch registration.</td></tr>
<tr><td>16)</td><td>Module fixing screw hole</td><td>Hole for the screw used to fix to the base unit. (M3 × 12 screw)</td></tr>
<tr><td>17)</td><td>Module fixing latch</td><td>Hook used to fix to the base unit.</td></tr>
<tr><td>18)</td><td>Battery connector pin</td><td>For connection of battery lead wires.<br>(When shipped from the factory, the lead wires are disconnected from the connector to prevent the battery from consuming.)</td></tr>
<tr><td>19)</td><td>Battery</td><td>Backup battery for use of program memory, standard RAM and power failure compensation function.</td></tr>
</table>

∗1 : When normally connecting a cable to the USB connector or RS-232 connector, clamp the cable to prevent it from coming off due to the dangling, moving or carelessly pulling of the cable.
Q6HLD-R2 type RS-232 Connector Disconnection Prevention Holder is available as a clamp for RS-232 connector.



## 4.3 Switch Operation After Writing in Program

When writing a program into the CPU module, do not turn off the system protect set switch SW1 in advance (When the switch is turned off, the system will not be protected).

### (1) When a program is written while CPU module is stopped:

When a program is written while the CPU module is stopped, operate the switch in the order shown below.

1) RUN / STOP switch : STOP
"RUN" LED: Turns off CPU module in stop status → Write a program.

2) RESET / L.CLR switch : Tilt this switch to RESET once, and return it to the original center position.

3) RUN / STOP switch : STOP → RUN
"RUN" LED: Turns on CPU module in running status

### (2) When a program is written while CPU module is running.

When a program is written while the CPU module is running, the switch need not be operated.

**POINTS**

(1) Even if the RUN/STOP switch is set to RUN immediately after a program is written when the CPU module is in the stop status, CPU module will not come into RUN status. When the CPU module is reset with the RESET / L.CLR switch and the RUN/STOP switch is set to RUN after a program has been written, the CPU module can be brought into RUN status.

(2) If the CPU module is desired to be brought into RUN status without resetting it, operate the RUN/STOP switch from STOP to RUN, RUN to STOP, and STOP to RUN in that order.
After the seconds STOP to RUN switch operation, the CPU module is brought into RUN status.

(3) When a program is written while the CPU module is running in boot operation, the program written during the running is written into the program memory. After a program has been written while the CPU module is running, write the program also into the boot original memory. Failure to write a program into the boot original memory will run an old program at the time of the next boot operation.
(For details of the boot operation, see Process CPU User's Manual (Function Explanation, Program Fundamentals) ).

## 4.4 Latch Clear Operation

To perform latch clear, operate the RESET/L.CLR switch in the following procedure.

1) RUN/STOP switch : STOP

2) RESET/L.CLR switch : Move the switch to L.CLR several times until the USER LED flickers.
"USER" LED: Flicker Ready for latch clear.

3) RESET/L.CLR switch : Move the switch to L.CLR once more.
"USER" LED: OFF Latch clear complete.

**POINTS**

(1) The ineffective range for latch clear can be set for each device by the device setting parameter.

(2) In addition to the way of using the RESET/L.CLR switch for latch clear, remote latch clear may be performed from GX Developer.
Refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).

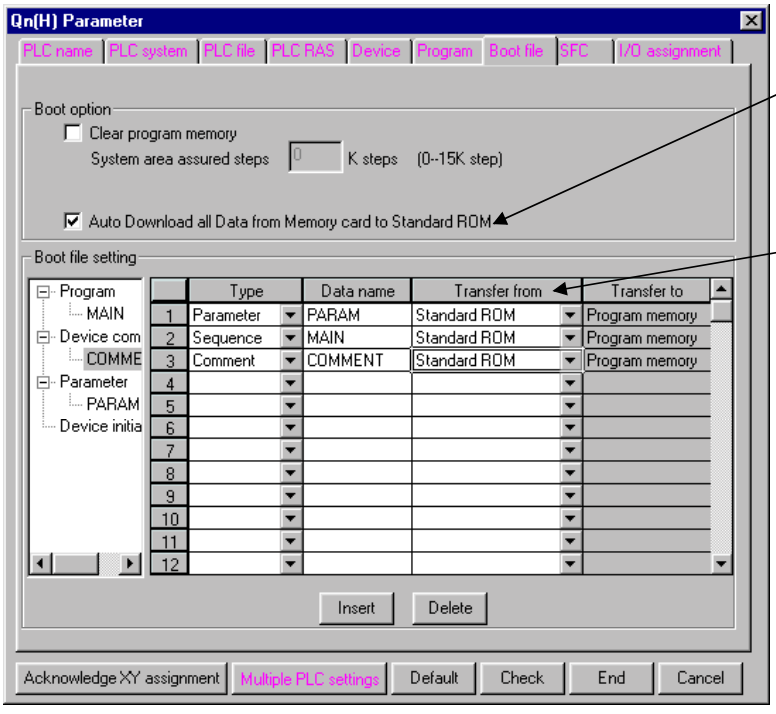
## 4.5 Executing automatic write to standard ROM.

### (1) Order of execution for automatic write to standard ROM

Automatic write to the standard ROM is carried out with the following procedures.

(a) Operation with GX Developer (setting automatic write to standard ROM)

1) Check the "Auto Download all Data from Memory card to standard ROM" item in the PLC parameter boot file setting.
Set the parameter and program to be booted at the "Boot file setting" section.
(Set the "Transfer from" to the "Standard ROM".)




Check "Auto Download all Data from Memory card to standard ROM ".

Set the "Transfer from" to "Standard ROM".

2) Store the set parameters and programs to be booted in the memory card.

(b) Operations with CPU module (automatic write to standard ROM)

1) Switch OFF the power supply to the PLC.

2) Mount the memory card that contains the parameters and programs to be booted onto the CPU module.

3) Set the parameter's valid drive in the mounted memory card with the CPU module's dip switches.
   • When a SRAM card is mounted: SW2 : ON, SW3 : OFF
   • When a Flash/ATA card is mounted: SW2 : OFF, SW3 : ON

4) Switch ON the power supply to the PLC.

5) "BOOT" LED will flicker when automatic write to standard ROM has been completed, and the CPU module will assume a suspension error status.

6) Switch OFF the power supply to the PLC.

7) Remove the memory card, and then set the parameter's valid drive in the standard ROM with the CPU module's dip switches.
   • Standard ROM: SW2 : ON, SW3 : ON

(c) The parameters and programs will be booted from the standard ROM to the program memory when the PLC is switched on to enable actual operations.

## 4.6 Online module change

Online module change is a function to change the Q Series module mounted on the main or extension base unit during control of the PLC system.
If a module fails during control, it can be changed to the same type module by using this function.

**POINT**

(1) An online module change does not add a module or change it for a module of another type.
(2) To perform an online module change using a Process CPU module in a multiple PLC system, "Enable online module change" must be selected in the multiple PLC setting dialog box on the PLC parameter screen.
There are restrictions on the versions of the CPU modules that configure a multiple PLC system. For details, refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).
(3) Perform an online module change after making sure that the system outside the PLC will not malfunction.
(4) It is necessary to turn OFF the external power for the module changed online to prevent an electric shock or like.

### (1) Conditions for performing online module change

An online module change is available under the following conditions.

#### (a) Online changeable modules

The following table indicates online changeable modules.

| Module Type | | Restriction |
|---|---|---|
| Input module | | No restrictions |
| Output module | | |
| I/O mixed module | | |
| Intelligent function module | Analog-digital converter module | Supported by function version "C" |
| | Digital-analog converter module | |
| | Temperature input module | |
| | Temperature control module | |

The other modules cannot be changed online.
For whether the above intelligent function modules can be changed online or not and their changing procedures, refer to the manuals of the intelligent function modules used.

#### (b) GX Developer that enables online module change

GX Developer Version 7.10L or later is necessary for online module change.
An online module change is available from GX Developer via a network.

(c) Base unit that enables online module change

1) For an online module change, use the main base and Q6□B extension base.
The module installed on the main base or Q6□B extension base is not available for online change.

2) The module installed on the Q5□B extension base is not available for online change.
When the Q5□B is in use, the module installed on the main base is not available for online change.

(d) Control status of CPU module

1) An online module change is available when there is no stop error.
The following table indicates whether an online module change is available depending on the control status of the CPU module.

| Control Status | RUN Status ∗1 | STOP Status | PAUSE Status | At Stop Error |
|---|---|---|---|---|
| Online module change | Enabled | Enabled | Enabled | Disabled |

∗1: This includes a RUN status at the occurrence of a continuation error.

2) An online module change can be continued if the control status of the CPU module is changed to STOP/PAUSE during the online module change.
In either of the following cases, however, the online module change cannot be continued.
• The CPU module was reset.
• A stop error occurred.

(e) Number of modules that can be changed online

The number of modules that can be changed online at one time is one per CPU module.
You cannot change two or more modules at the same time.

(2) Restrictions during online module change

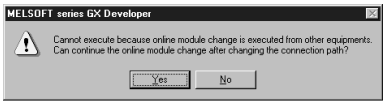
The following operations fail an online module change.

(a) One CPU module gets the online module change orders from multipe GX Developer at the same time. (Requests from multiple GX Developers are made of one CPU module for an online module change.)

(b) Parameters are written to the CPU module during an online module change.

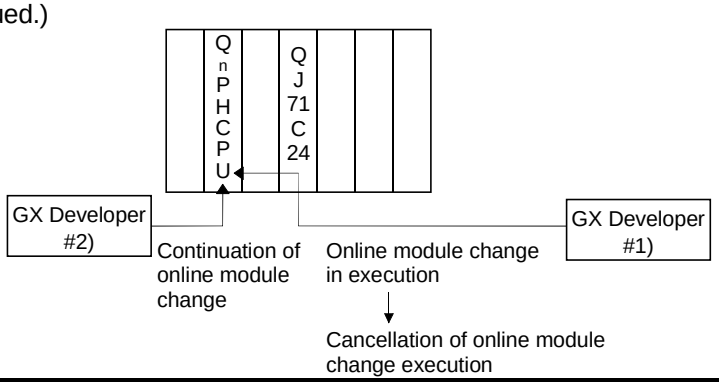
POINT

The following message will appear in case one CPU module gets the online module change orders from multipe GX Developer at the same time. .
After confirming the message, choose "Yes" or "No".


MELSOFT series GX Developer
Cannot execute because online module change is executed from other equipments.
Can continue the online module change after changing the connection path?
Yes
No

• When you selected "Yes"
Operation for an online module change is switched to that of GX Developer #2) that request later. (Operation is continued from the pre-switching status.)

• When you selected "No"
Operation for an online module change (GX Developer #2)) requested later is suspended. (The online module change (GX Developer #1)) already in execution is continued.)


Q n P H C P U
Q J 71 C 24
GX Developer #2)
GX Developer #1)
Continuation of online module change
Online module change in execution
Cancellation of online module change execution

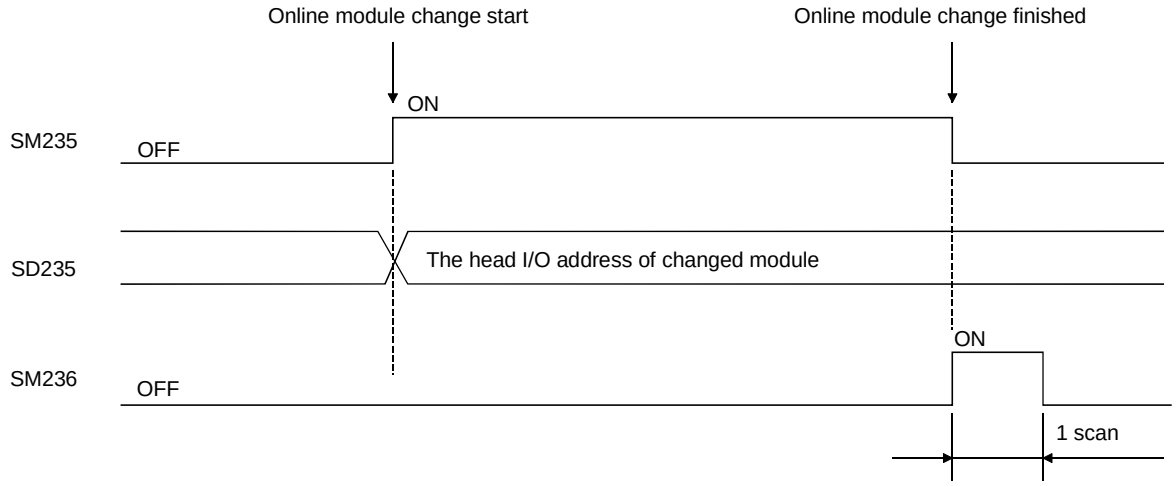
### (3) Special relays and special registers related to online module change

Indication for online module change is stored into the special relays (SM235, SM236) and special register (SD235).

By monitoring SM235, SM236 and SD235, shows the status for online module change.

- SM235: Online module change flag (Holds ON during online module change.)
- SM236: Online module change completion flag (Turns ON only one scan after the online module change finished.)
- SD235: Online changed module address (The head I/O address of module being changed online / 10H is stored.)

Refer to Section 11.6 for details of SM235 and SM236, and Section 11.7 for details of SD235.





4 - 13

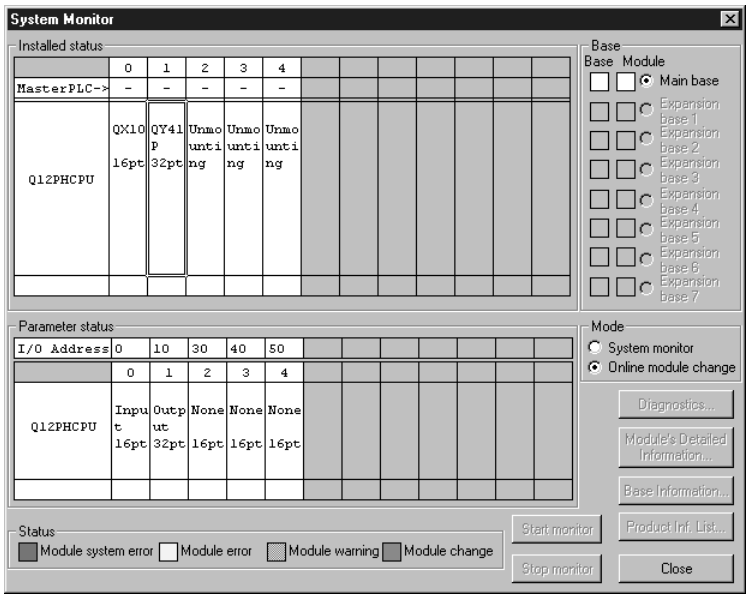
### (4) Online module change procedure

The online module change procedure for an I/O module is explained here.
Please refer to the intelligent function module's manual about its online module change procedure.

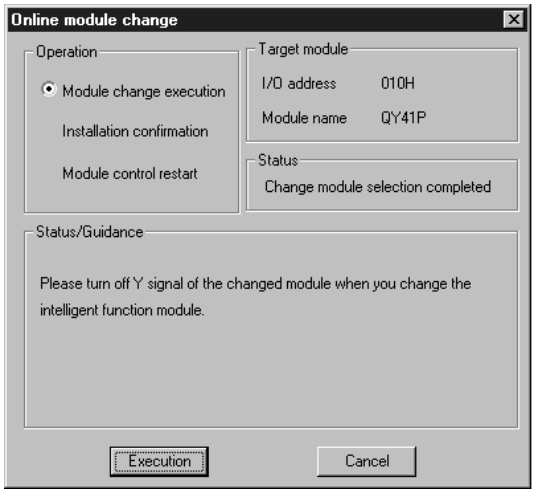
**POINT**

It is recommended to turn OFF the output (Y) from the output or I/O mixed module before its on line change.

(a) Click [Diagnosis] - [Online module change] on GX Developer to select the "Online module change" mode.

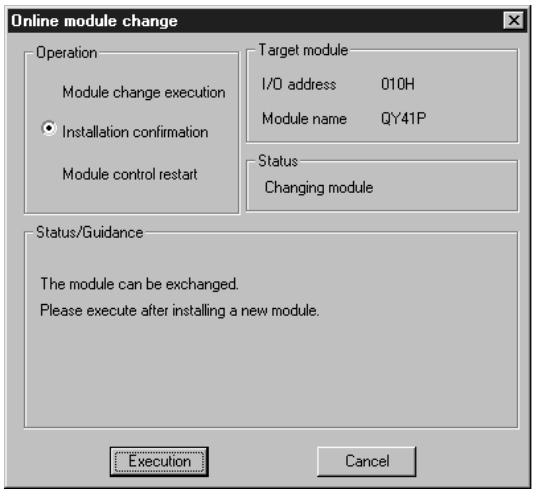


(b) Double-click the module to be changed online to display the Online module change screen.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)




| Target Module, Item | Executed/ Not Executed |
|---|---|
| Input module refresh | Executed |
| Output module refresh | Executed |
| I/O mixed module | |
| Input refresh | Executed |
| Output refresh | Executed |
| Intelligent function module | |
| Input refresh | Executed |
| Output refresh | Executed |
| FROM/TO instruction | Executed |
| Instruction using intelligent function module device | Executed |
| instruction dedicated for Intelligent function module | Executed |
| automatic refresh of intelligent function module | Executed |
| Buffer memory batch monitor | Executed |

(c) Click the [Execution] button to enable a module change.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)

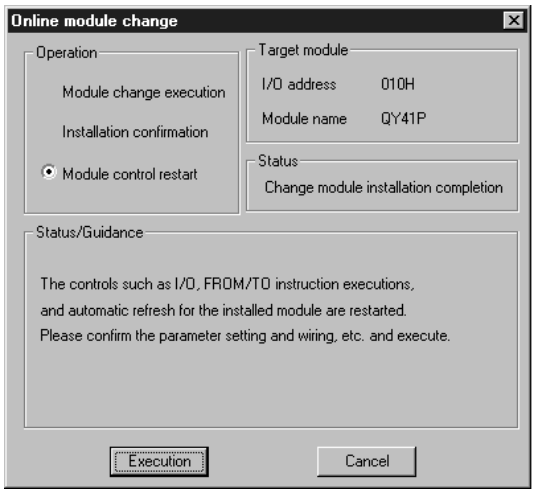



| Target Module, Item | Executed/ Not Executed |
|---|---|
| Input module refresh | Not executed (Data is held) |
| Output module refresh | Not executed |
| I/O mixed module | |
| Input refresh | Not executed (Data is held) |
| Output refresh | Not executed |
| Intelligent function module | |
| Input refresh | Not executed |
| Output refresh | Not executed |
| FROM/TO instruction | No processing |
| Instruction using intelligent function module device | No processing |
| instruction dedicated for Intelligent function module | No processing |
| automatic refresh of intelligent function module | No processing |
| Buffer memory batch monitor | Communication error |

(d) Disconnect the external wiring and dismount the module.
Refer to Section 9.3.3 for module dismounting.

(e) Mount a new module to the same slot and connect the external wiring.
Refer to Section 9.3.3 for module mounting.

(f) After mounting the module, click the "Execution" button.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)




| Target Module, Item | Executed/ Not Executed |
|---|---|
| Input module refresh | Not executed (Data is held) |
| Output module refresh | Not executed |
| I/O mixed module | |
| Input refresh | Not executed (Data is held) |
| Output refresh | Not executed |
| Intelligent function module | |
| Input refresh | Executed |
| Output refresh | Executed |
| FROM/TO instruction | No processing |
| Instruction using intelligent function module device | No processing |
| instruction dedicated for Intelligent function module | No processing |
| automatic refresh of intelligent function module | No processing |
| Buffer memory batch monitor | Communication error |

*: If the initial settings of the intelligent function module have been made using GX Configurator, the preset data are written to the intelligent function module.

(g) Click the "Execution" button to start control.

(h) The "Online module change completed" screen appears.
(The following table indicates the status of communication with the module changed onlinely, when the following screen is displayed.)

| Target Module, Item | Executed/ Not Executed |
|---|---|
| Input module refresh | Executed |
| Output module refresh | Executed |
| I/O mixed module | |
| Input refresh | Executed |
| Output refresh | Executed |
| Intelligent function module | |
| Input refresh | Executed |
| Output refresh | Executed |
| FROM/TO instruction | Executed |
| Instruction using intelligent function module device | Executed |
| instruction dedicated for Intelligent function module | Executed |
| automatic refresh of intelligent function module | Executed |
| Buffer memory batch monitor | Executed |

# 5. POWER SUPPLY MODULE

## 5.1 Specification

### 5.1.1 Power supply module specifications

This section gives the specifications of the power supply modules.

| Item | | Performance Specifications | | | |
|---|---|---|---|---|---|
| | | Q61P-A1 | Q61P-A2 | Q62P | Q63P |
| Base loading position | | Power supply module loading slot | | | |
| Applicable base unit | | Q3□B, Q6□B | | | |
| Input power supply | | 100 to 120VAC +10% -15% (85 to 132VAC) | 200 to 240VAC +10% -15% (170 to 264VAC) | 100 to 240VAC +10% -15% (85 to 264VAC) | 24VDC +30% -35% (15.6 to 31.2VDC) |
| Input frequency | | 50/60Hz ±5% | | | —— |
| Input voltage distortion factor | | Within 5% (See, section 5.1.3) | | | —— |
| Max. input apparent power | | 105VA | | | —— |
| Max. input power | | —— | | | 45W |
| Inrush current | | 20A within 8ms | | | 100A within 1ms |
| Rated output current | 5VDC | 6A | | 3A | 6A |
| | 24VDC | —— | | 0.6A | —— |
| External output voltage | | —— | | 24VDC ±10% | —— |
| Overcurrent protection ∗1 | 5VDC | 6.6A or more | | 3.3A or more | 6.6A or more |
| | 24VDC | —— | | 0.66A or more | —— |
| Overvoltage protection ∗2 | 5VDC | 5.5 to 6.5V | | | |
| | 24VDC | —— | | | |
| Efficiency | | 70% or more | | 65% or more | 70% or more |
| Permissible instantaneous power failure time ∗3 | | Within 20ms | | | Within 10ms (at 24VDC input) |
| Dielectric withstand voltage | | Across inputs/LG and outputs/FG 2,830VAC rms/3 cycles (2000 m (6562 ft.)) | | | 500VAC across primary and 5VDC |
| Insulation resistance | | Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10MΩ or more by insulation resistance tester | | | 10MΩ or more by insulation resistance tester |
| Noise immunity | | • By noise simulator of 1,500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency<br>• Noise voltage IEC61000-4-4, 2kV | | | By noise simulator of 500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency |
| Operation indication | | LED indication (lit at 5VDC output) | | | |
| Fuse | | Built-in (Unchangeable by user) | | | |
| Contact output section | Application | ERR contact (contact switched off (opened: normally closed contact) at an error stop of CPU module), for CPU module operating status output | | | |
| | Rated switching voltage/current | 24VDC, 0.5A | | | |
| | Minimum switching load | 5VDC, 1mA | | | |
| | Response time | OFF to ON: 10ms max. ON to OFF: 12ms max. | | | |
| | Life | Mechanical : More than 2 million times<br>Electrical : More than 100 thousand times at rated switching voltage/current | | | |
| | Surge suppressor | No | | | |
| | Fuse | No | | | |
| Terminal screw size | | M3.5 × 7 | | | |
| Applicable wire size | | 0.75 to 2mm$^2$ | | | |
| Applicable crimping terminal | | RAV1.25 to 3.5, RAV2 to 3.5 | | | |
| Applicable tightening torque | | 59 to 88N•cm | | | |
| External dimensions | H | 98mm (3.86inch) | | | |
| | W | 55.2mm (2.33inch) | | | |
| | D | 90mm (3.55inch) | | | |
| Weight | | 0.31kg | | 0.39kg | 0.33kg |

Power Supply Module Specifications (Continued)

| Item | | Performance Specifications |
|---|---|---|
| | | Q64P |
| Base loading position | | Power supply module loading slot |
| Applicable base unit | | Q3□B, Q6□B |
| Input power supply | | 100 to 120VAC/200 to 240VAC +10% -15%<br>(85V to 132VAC/170 to 264VAC) |
| Input frequency | | 50/60Hz ±5% |
| Input voltage distortion factor | | Within 5% (See. section 5.1.3) |
| Max. input apparent power | | 160VA |
| Inrush current | | 20A within 8ms |
| Rated output current | 5VDC | 8.5A |
| | 24VDC | —— |
| Overcurrent protection*1 | 5VDC | 9.9 to 14.4A |
| | 24VDC | —— |
| Overvoltage protection*2 | 5VDC | 5.5 to 6.5V |
| | 24VDC | —— |
| Efficiency | | 70% or more |
| Allowable momentary power failure period*3 | | Within 20ms |
| Dielectric withstand voltage | | Across inputs/LG and outputs/FG<br>2,830VAC rms/3 cycles (2000 m (6562 ft.)) |
| Insulation resistance | | Across inputs and outputs (LG and FG separated), across inputs and LG/FG, across outputs and FG/LG 10MΩ or more by insulation resistance tester |
| Noise durability | | • By noise simulator of 1,500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency<br>• Noise voltage IEC61000-4-4, 2kV |
| Operation indication | | LED indication (lit at 5VDC output) |
| Fuse | | Built-in (Unchangeable by user) |
| Contact output section | Application | ERR contact (contact switched off (opened: normally closed contact) at an error stop of CPU module), for CPU module operating status output |
| | Rated switching voltage, current | 24VDC, 0.5A |
| | Minimum switching load | 5VDC, 1mA |
| | Response time | OFF to ON: 10ms max. ON to OFF: 12ms max. |
| | Life | Mechanical : More than 2 million times<br>Electrical : More than 100 thousand times at rated switching voltage, current |
| | Surge suppressor | No |
| | Fuse | No |
| Terminal screw size | | M3.5 × 7 |
| Applicable wire size | | 0.75 to 2mm$^2$ |
| Applicable solderless terminal | | RAV1.25 to 3.5, RAV2 to 3.5 |
| Applicable tightening torque | | 59 to 88N•cm |
| External dimensions | H | 98mm (3.86inch) |
| | W | 55.2mm (2.33inch) |
| | D | 115mm (4.53inch) |
| Weight | | 0.40kg |

POINTS

∗1 : Overcurrent protection

The overcurrent protection device shuts off the 5 V, 24 VDC circuit and stops the system if the current flowing in the circuit exceeds the specified value. If this device is activated, switch the input power supply off and eliminate the cause such as insufficient current capacity or short. Then, a few minutes later, switch it on to restart the system.

The initial start for the system takes place when the current value becomes normal.

∗2 : Overvoltage protection

The overvoltage protection device shuts off the 5 VDC circuit and stops the system if a voltage of 5.5 to 6.5 V is applied to the circuit. When this device is activated, the power supply module LED is switched OFF. If this happens, switch the input power OFF, then a few minutes later ON. This causes the initial start for the system to take place. The power supply module must be changed if the system is not booted and the LED remains OFF.

∗3 : Permissible instantaneous power failure time

(1) For AC input power supply

- An instantaneous power failure lasting less than 20ms will cause AC down to be detected, but operation will continue.
- An instantaneous power failure lasting more than 20ms may cause the operation to continue or initial start to take place depending on the power supply load.

  Furthermore, by using the same AC power supply for the AC input module and the power supply module, it is possible to prevent the sensor, to which the AC input module is connected, from turning OFF when it is ON when the power is turned OFF.

  However, if only the AC input module is connected to the AC line, which is connected to the power suppludetection of the AC down for the power supply module may be delayed by the capacitor in the AC input module. Thus, connect a load of approx. 30mA per QX10 unit to the AC line.

(2) For DC input power supply

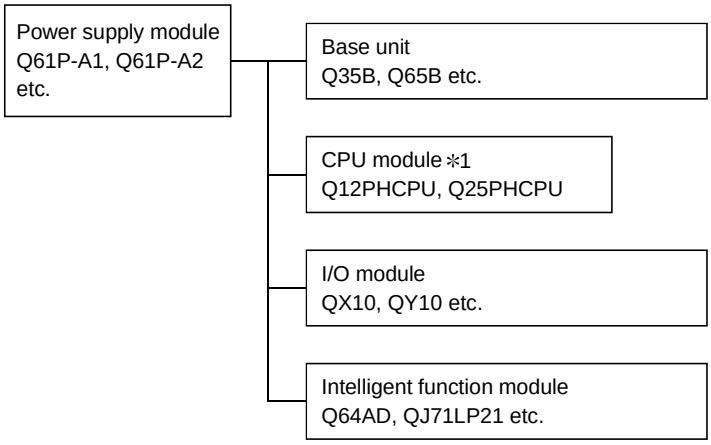
- An instantaneous power failure lasting less than 10ms (*1) will cause 24VDC down to be detected, but operation will continue.
- An instantaneous power failure lasting more than 10ms (*1) may cause the operation to continue or initial start to take place depending on the power supply load.

(∗1: This is for a 24VDC input. This is 10ms or less for 24VDC or less.)

## 5.1.2 Selecting the power supply module

The power supply module is selected according to the total of current consumption of the base units, I/O modules and intelligent function module, supplied by its power supply module.
For the internal current consumption of 5 VDC of the base unit, see the Base Unit Chapter of this manual.
For the internal current consumption of 5 VDC of the I/O modules, intelligent function module, special function module, and peripheral devices, see the User's Manuals of their respective modules.

### (1) When the base unit is of Q3□B or Q6□B:




✻1: The CPU module is loaded on the Q3□B main base unit.

(a) Selection of power supply module for use of Q52B or Q55B extension base unit

Using the Q52B or Q55B supplies 5VDC power from the power supply module of the main base unit through the extension cable.
Therefore, note the following when using the Q52B or Q55B.

1) The power supply module to be loaded on the main base unit should be selected to cover also the 5VDC used on the Q52B or Q55B.
For example, either of the following power supply modules must be mounted on the main base unit, when the current consumption on the main base unit is 3A and that on the Q52B or Q55B is 1A.

| 5VDC Rated output current | Type |
|---|---|
| 6A | Q61P-A1, Q61P-A2, Q63P |
| 8.5A | Q64P |

2) Since 5VDC is supplied to the Q52B or Q55B through the extension cable, a voltage drop occurs at the extension cable.
You must select the power supply module and extension cable length to ensure that the "IN" connector voltage of the Q52B or Q55B is 4.75V or more.
For details of a voltage drop, refer to Section 6.6 Guideline for Use of Extension Base Units.

(b) Ideas for reducing voltage drops

The following methods are effective to reduce voltage drops at the extension cables.

1) Changing the module loading positions

Load large current consumption modules on the main base unit.

Load small current consumption modules on the extension base unit.

2) Using short extension cables

The shorter the extension cable is, the smaller the resistance and voltage drops are.

Use the shortest possible extension cables.

### 5.1.3 Precaution when connecting the uninterruptive power supply

Be sure of the following terms when connecting the Process CPU system to the uninterruptive power supply (abbreviated as UPS hereafter):

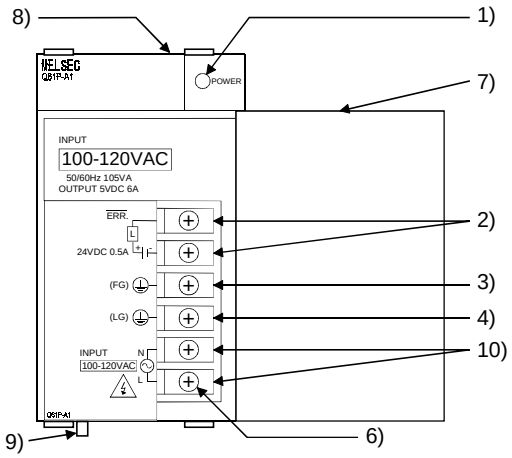
Use a UPS which employs the constant inverter power supply method with 5 % or less voltage fluctuation.

Do not use a UPS with the constant commercial power supply method.

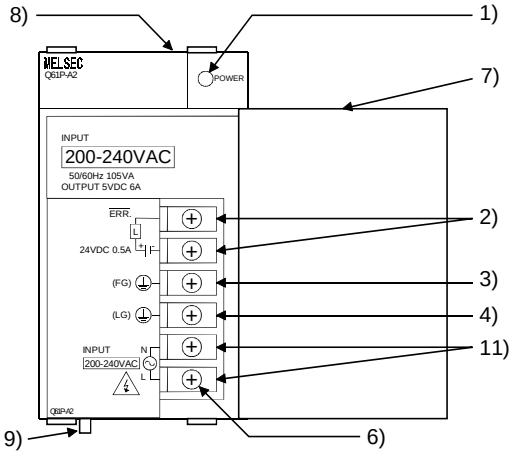
## 5.2 Names of Parts and Settings

The names of the parts of each power supply module are described below.

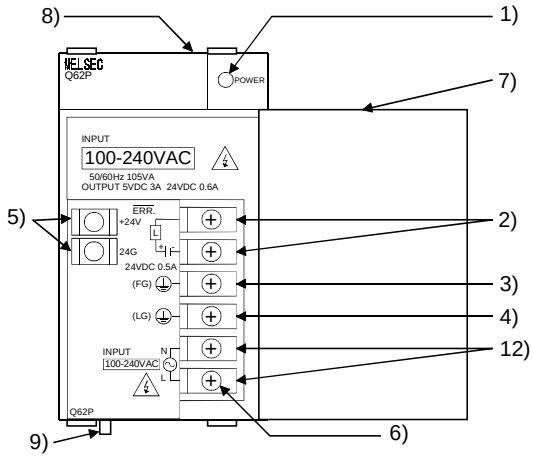
### (1) Q61P-A1, Q61P-A2, Q62P, Q63P, Q64P



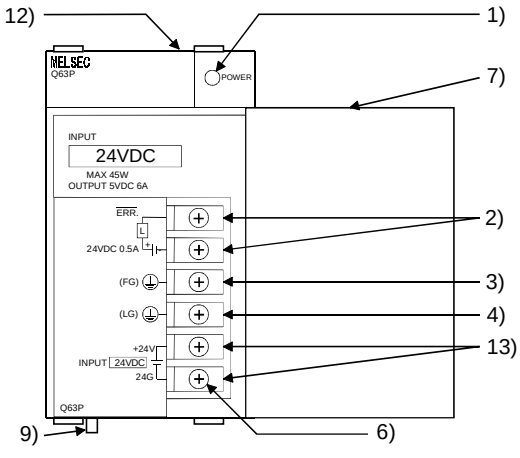

Q61P-A1



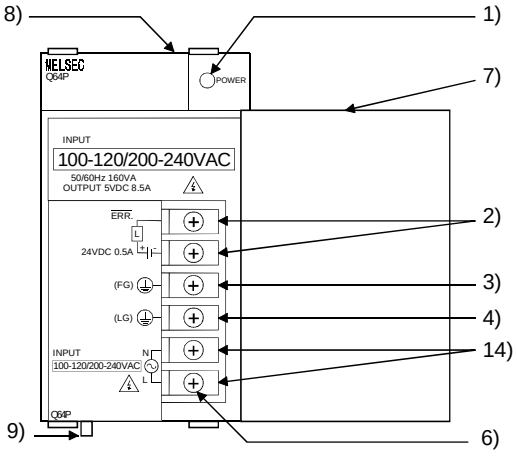

Q61P-A2




Q62P




Q63P




Q64P

| No. | Name | Application |
|---|---|---|
| 1) | POWER LED | 5VDC power indicator LED |
| 2) | $\overline{\text{ERR}}$ terminals | 1) Turned ON when the whole system operates normally.<br>2) Turned OFF (opened) when a stop error occurs in the CPU module.<br>3) In a multiple PLC system configuration, turned OFF when a stop error occurs in any of the CPU modules.<br>Normally off when loaded in an extension base unit. |
| 3) | FG terminal | Ground terminal connected to the shield pattern of the printed circuit board. |
| 4) | LG terminal | Grounding for the power supply filter. The potential of Q61P-A1, Q61P-A2, Q64P and Q62P terminal is 1/2 of the input voltage |
| 5) | +24V, 24G terminals | Used to supply 24VDC power to inside the output module (using external wiring). |
| 6) | Terminal screw | M3.5 × 7 screw |
| 7) | Terminal cover | Protective cover of the terminal block |
| 8) | Module fixing screw hole | Used to fix the module to the base unit. M3 × 12 screw (user-prepared)<br>(Tightening torque : 36 to 48N•cm) |
| 9) | Module loading lever | Used to load the module into the base unit. |
| 10) | Power input terminals | Used to connect a 100VAC power supply. |
| 11) | Power input terminals | Used to connect a 200VAC power supply. |
| 12) | Power input terminals | Used to connect a 100VAC to 200VAC power supply. |
| 13) | Power input terminals | Used to connect a 24VAC power supply. |
| 14) | Power input terminals | Used to connect a 100VAC/200VAC power supply. |

**POINTS**

(1) The Q61P-A1 is dedicated for inputting a voltage of 100 VAC. Do not input a voltage of 200 VAC into it or trouble may occur on the Q61P-A1.

| Power module type | Supply power voltage | |
|---|---|---|
| | 100VAC | 200VAC |
| Q61P-A1 | Operates normally. | Power supply module causes trouble. |
| Q61P-A2 | Power supply module does not cause trouble.<br>CPU module cannot be operated. | Operates normally. |

(2) Q64P automatically switches the input range 100/200VAC.
Therefore, it is not compatible with the intermediate voltage (133 to 169VAC).
The CPU module may not work normally if the above intermediate voltage is applied.

(3) Ensure that the earth terminals LG and FG are grounded.


5 - 7

# MEMO


5 - 8

# 6. BASE UNIT AND EXTENSION CABLE

This section describes the specifications of the extension cables for the base units (main base unit and extension base unit) used in the system and the specification standards of the extension base unit.

## 6.1 Base Unit Specification Table

### (1) Main base unit specifications

| Item \ Type | | Q33B | Q35B | Q38B | Q312B |
|---|---|---|---|---|---|
| Number of I/O modules installed | | 3 | 5 | 8 | 12 |
| Possibility of extension | | Extendable | | | |
| Applicable module | | Q series modules | | | |
| 5 VDC internal current consumption | | 0.105A | 0.110A (0.074A) ✻ | 0.114A (0.077A) ✻ | 0.121A (0.087A) ✻ |
| Mounting hole size | | M4 screw hole or $\phi$4.5 hole (for M4 screw) | | | |
| External dimensions | H | 98mm (3.86inch) | | | |
| | W | 189mm (7.44inch) | 245mm (9.65inch) | 328mm (12.92inch) | 439mm (17.30inch) |
| | D | 44.1mm (1.74inch) | | | |
| Weight | | 0.23kg | 0.25 kg | 0.35 kg | 0.45 kg |
| Attachment | | Mounting screw M4×14, 4 pieces (DIN rail mounting adapter to be sold separately) | | | |
| DIN rail mounting Adapter type | | Q6DIN3 | Q6DIN2 | Q6DIN1 | |

✻: The values in parentheses are those for the CE mark non-conforming products.

### (2) Extension base unit specification (Type not requiring power supply module)

| Item \ Type | | Q52B | Q55B |
|---|---|---|---|
| Number of I/O modules installed | | 2 | 5 |
| Possibility of extension | | Extendable | |
| Applicable module | | Q series modules | |
| 5 VDC internal current consumption | | 0.080A | 0.100A |
| Mounting hole size | | M4 screw hole or $\phi$ 4.5 hole (for M4 screw) | |
| External dimensions | H | 98mm (3.86inch) | |
| | W | 106mm (4.17inch) | 189mm (7.43inch) |
| | D | 44.1mm (1.74inch) | |
| Weight | | 0.14kg | 0.23kg |
| Attachment | | Mounting screw M4×14, 4 pieces (DIN rail mounting adapter to be sold separately) | |
| DIN rail mounting Adapter type | | Q6DIN3 | |

### (3) Extension base unit specifications

| Item \ Type | | Q63B | Q65B | Q68B | Q612B |
|---|---|---|---|---|---|
| Number of I/O modules installed | | 3 | 5 | 8 | 12 |
| Possibility of extension | | Extendable | | | |
| Applicable module | | Q series modules | | | |
| 5 VDC internal current consumption | | 0.105A | 0.110A ✻ (0.081A) | 0.114A ✻ (0.087A) | 0.121A ✻ (0.098A) |
| Mounting hole size | | M4 screw hole or ϕ4.5 hole (for M4 screw) | | | |
| External dimensions | H | 98mm (3.86inch) | | | |
| | W | 189mm (7.44inch) | 245mm (9.65inch) | 328mm (12.92inch) | 439mm (17.30inch) |
| | D | 44.1mm (1.74inch) | | | |
| Weight | | 0.23kg | 0.25 kg | 0.35 kg | 0.45 kg |
| Attachment | | Mounting screw M4×14 , 4 pieces (DIN rail mounting adapter sold separately) | | | |
| DIN rail mounting Adapter type | | Q6DIN3 | Q6DIN2 | Q6DIN1 | |

✻: The values in parentheses are those for the CE mark non-conforming products.

## 6.2 Extension Cable Specification Table

The list below shows the specifications of the extension cables which can be used for the Process CPU system.

| Item \ Type | QC05B | QC06B | QC12B | QC30B | QC50B | QC100B |
|---|---|---|---|---|---|---|
| Cable length | 0.45m (1.48ft.) | 0.6m (1.97ft.) | 1.2m (3.93ft.) | 3.0m (9.84ft.) | 5.0m (16.38ft.) | 10.0m (32.79ft.) |
| Application | Connection across the main base unit and extension base unit or across the extension base units. | | | | | |
| Weight | 0.15 kg | 0.16 kg | 0.22 kg | 0.40 kg | 0.60 kg | 1.11 kg |

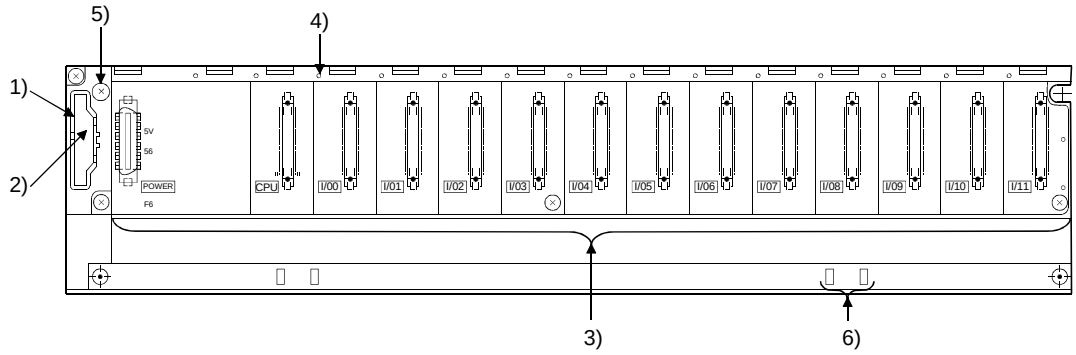
**POINT**

When the extension cables are used in combination, limit the overall distance of the combined cable to 13.2 m(43.28 ft.).

## 6.3 The Names of The Parts of The Base Unit

The names of the parts of the base unit are described below.

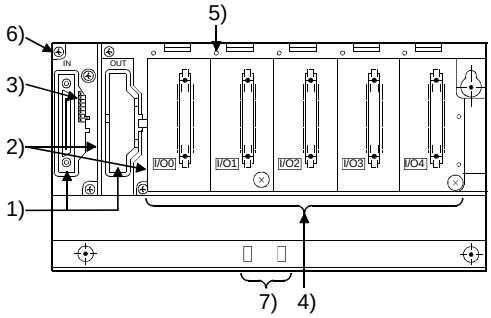
### (1) Main base unit(Q33B, Q35B, Q38B, Q312B)



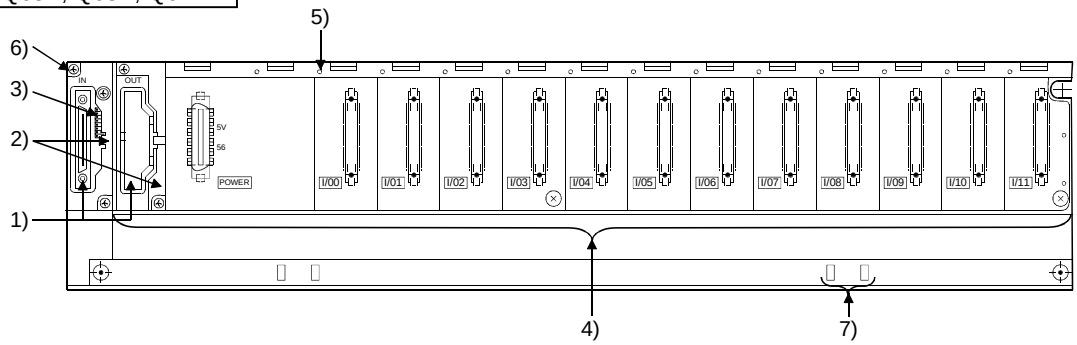

| No. | Name | Application |
|---|---|---|
| 1) | Extension cable connector | Connector for sending and receiving signals from the extension base unit, to which the extension cables are connected. |
| 2) | Base cover | Protective cover of extension cable connector. Before an extension cable is connected, the area of the base cover surrounded by the groove under the word "OUT" on the base cover must be removed with a tool such as nippers. |
| 3) | Module connector | Connector for installing the power supply module, CPU module, I/O modules, and intelligent function module.<br>To the connectors located in the spare space where these modules are not installed, attach the supplied connector cover or the blank cover module QG60 to prevent entry of dirt. |
| 4) | Module fixing screw hole | Screw hole for fixing the module to the base unit. Screw size:M3 × 12 |
| 5) | Base mounting hole | Hole for mounting this base unit onto the panel of the control panel (for M4 screw) |
| 6) | DIN rail adapter mounting hole | Hole for mounting DIN rail adapter |

## (2) Extension base unit (Q5□B, Q6□B)

Q52B, Q55B



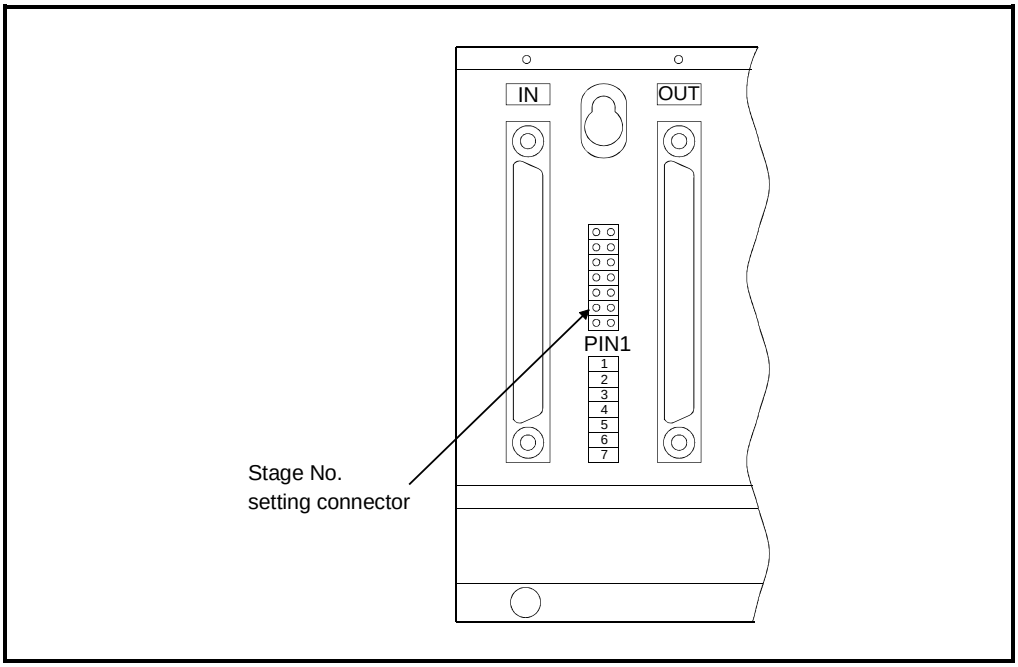

Q63B, Q65B, Q68B, Q612B



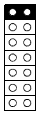
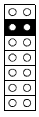
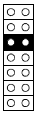
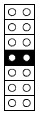
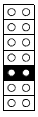
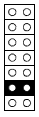

| No. | Name | Application |
|---|---|---|
| 1) | Extension cable connector | Connectors for sending and receiving signals from the main base unit or the other extension base units, to which the extension cables are connected.<br>Do not remove the supplied connector cover. |
| 2) | Base cover | Protective cover of extension cable connector. |
| 3) | Stages No. setting connector | Switch for setting the number of stages of the extension base unit.<br>For setting method, see Section 6.4. |
| 4) | Module connector | Connectors for installing the power supply module, I/O modules, and intelligent function module.<br>To those connectors located in the spare space where these modules are not installed, apply the supplied connector cover or the blank cover module to prevent entry of dirt.<br>Blank cover module applicable to Q52B, Q55B, Q63B, Q65B, Q68B and Q612B :QG60 |
| 5) | Module fixing screw hole | Screw hole for fixing the module to the base unit.<br>Q52B, Q55B, Q63B, Q65B,Q68B and Q612B Screw size: M3 × 12 |
| 6) | Base mounting hole | Hole for mounting this base unit on the panel of the control panel.<br>Q52B, Q55B, Q63B, Q65B,Q68B and Q612B For M4 screw |
| 7) | DIN rail hook | DIN rail adapter mounting hole. |

## 6.4 Setting the Extension Base Unit

The number of stages setting method of each extension base unit to be used when extension base units are installed is described below.




Setting of Stage Number for Extension Base Units

| | Number Setting for Extension Stages | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1st stage | 2nd stage | 3rd stage | 4th stage | 5th stage | 6th stage | 7th stage |
| Setting of stage No. setting connector |  |  |  |  |  |  | |

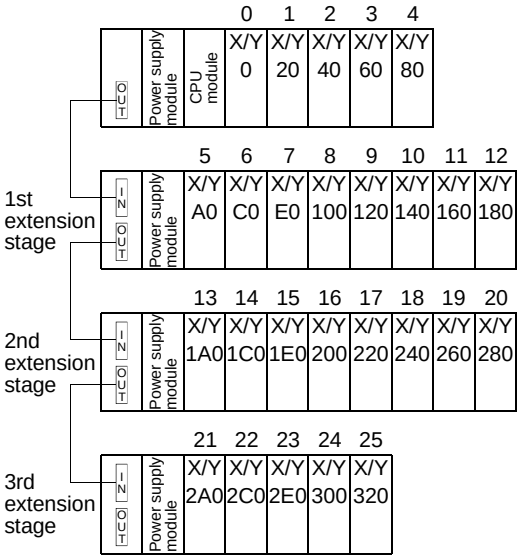
**POINTS**

To set the stages No. setting connector, set a number from 1 to 7 according to the number of extension stages.

Do not set the same stage number at two or more positions or do not fail to set a number. A miss-input or miss-output may occur.

## 6.5 I/O Number Allocation

The I/O numbers are automatically allocated in the system loading status.




✻ In this system, 32-point modules are loaded on slots 0 to 25.

For the I/O number setting method using GX Developer, refer to the Operating Manual of GX Developer.

For details of I/O number allocation, refer to the following manual.

• Process CPU User's Manual (Function Explanation, Program Fundamentals)

## 6.6 Guideline for Use of Extension Base Units (Q5□B)

Since the Q5□B is supplied with 5VDC from the power supply module on the main base unit, a voltage drop occurs at extension cables.
Improper I/O may be provided if the specified voltage (4.75VDC or higher) is not supplied to the "IN" connector of the Q5□B.
When using the Q5□B, make sure that the "IN" connector of the Q5□B is supplied with 4.75VDC or higher.

And it is recommend to connect it with the shortest possible extension cable right after connecting the main base unit, so as to minimize the effects of voltage drop.

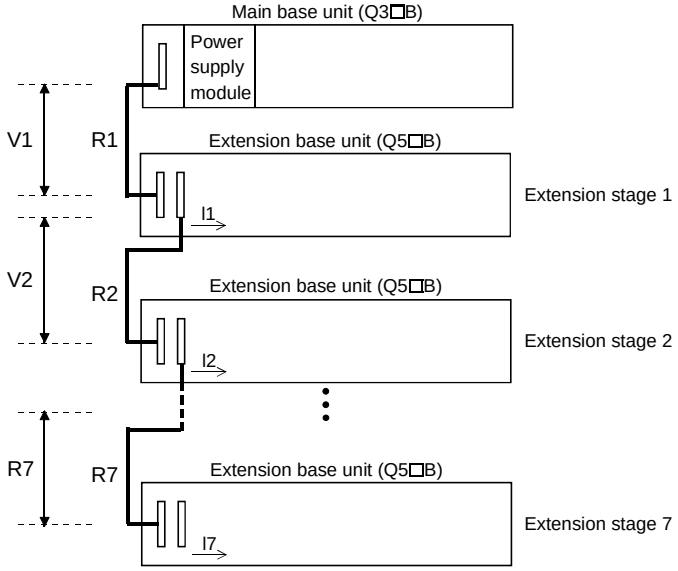
### (1) When only the Q5□B is connected to the extension base

#### (a) Selection condition

4.75VDC or higher should be supplied to the "IN" connector of the Q5□B in the final extension stage.

#### (b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.
Therefore, the Q5□B can be used if the voltage drop is 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).




| Extension Cable Type | Extension Cable Conductor Resistance (Ω) |
|---|---|
| QC05B | 0.044 |
| QC06B | 0.051 |
| QC12B | 0.082 |
| QC30B | 0.172 |
| QC50B | 0.273 |
| QC100B | 0.530 |

| Symbol | Description |
|---|---|
| V1 | Voltage drop at the extension cable between the main base unit and extension base unit |
| Vn | Voltage drop at the extension cable between the extension base unit (extension stage n-1) and extension base unit (extension stage n) |
| R1 | Cable resistance between the main base unit and extension base unit |
| Rn | Cable resistance between the extension base unit (extension stage n-1) and extension base unit (extension stage n) |
| I1 to I7 | 5VDC current consumption among extension stage 1 to 7 ＊1 |

＊1: Sum total of current consumed by Q5□B and currents consumed by the I/O, intelligent function modules loaded on the Q5□B.
The symbols including "I" (I1 to I7) vary with the modules loaded on the extension base unit. For details of the symbol, refer to the user's manuals of the module used.

List for Calculating Voltage Drops Occurring at Extension Cables in System Consisting of Extensions 1 to 7

| Q5□B Loading Position | Voltage Drop at Extension Cable on Corresponding Extension Unit | | | | | | | Sum Total of Voltage Drops to "IN" Connector of Q5□B (V) |
|---|---|---|---|---|---|---|---|---|
| | V1 | V2 | V3 | V4 | V5 | V6 | V7 | |
| Extension stage 1 | R1 • I1 | — | — | — | — | — | — | V=V1 |
| Extension stage 2 | R1(I1+I2) | R2 • I2 | — | — | — | — | — | V=V1+V2 |
| Extension stage 3 | R1(I1+I2+I3) | R2(I2+I3) | R3 • I3 | — | — | — | — | V=V1+V2+V3 |
| Extension stage 4 | R1(I1+I2+I3+I4) | R2(I2+I3+I4) | R3(I3+I4) | R4 • I4 | — | — | — | V=V1+V2+V3+V4 |
| Extension stage 5 | R1(I1+I2+I3+I4 +I5) | R2(I2+I3+I4+I5) | R3(I3+I4+I5) | R4(I4+I5) | R5 • I5 | — | — | V=V1+V2+V3+V4+V5 |
| Extension stage 6 | R1(I1+I2+I3+I4 +I5+I6) | R2(I2+I3+I4+I5 +I6) | R3(I3+I4+I5+I6) | R4(I4+I5+I6) | R5(I5+I6) | R6 • I6 | — | V=V1+V2+V3+V4+V5+ V6 |
| Extension stage 7 | R1(I1+I2+I3+I4 +I5+I6+I7) | R2(I2+I3+I4+I5 +I6+I7) | R3(I3+I4+I5+I6 +I7) | R4(I4+I5+I6+I7) | R5(I5+I6+I7) | R6(I6+I7) | R7 • I7 | V=V1+V2+V3+V4+V5+ V6+V7 |

The voltage supplied to "IN" connector of the Q5□B in the final extension reaches 4.75 VDC or higher on the condition that the sum total of voltage drop to "IN" connector of Q5□B (V) is 0.15V or lower.

### (2) When the Q6□B is connected between the Q3□B and the Q5□B

#### (a) Selection condition

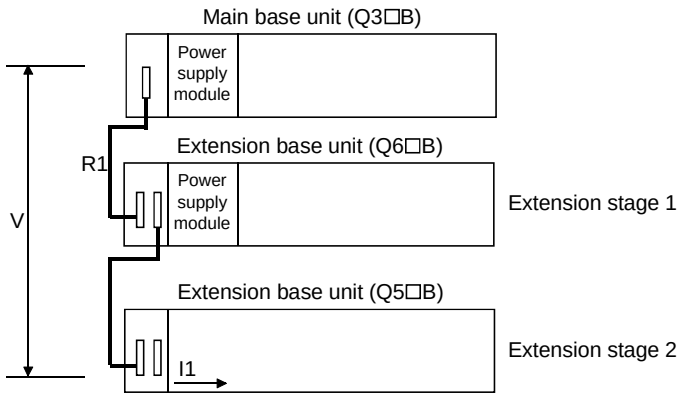
4.75VDC or higher should be supplied to the "IN" connector of the Q5□B in the final extension.

#### (b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.

Therefore, the Q5□B can be used if the voltage drop is 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).

[When the Q5□B is connected to Extension stage 2.]




| Extension Cable Type | Extension Cable Conductor Resistance (Ω) |
|---|---|
| QC05B | 0.044 |
| QC06B | 0.051 |
| QC12B | 0.082 |
| QC30B | 0.172 |
| QC50B | 0.273 |
| QC100B | 0.530 |

| Symbol | Description |
|---|---|
| V | Voltage drop at the extension cable between the main base unit and Q5□B extension base unit |
| In | 5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 6, n: Extension No. of Q6□B connected<br>(Sum total of current consumed by Q5□B and currents consumed by the I/O, intelligent function modules loaded on the Q5□B.) |
| Rn | Extension cable resistance between the main base unit (or the Q6□B extension base unit) and the Q6□B extension base unit |
| Rn+1 | Extension cable resistance between the Q6□B extension base unit and Q5□B extension base unit |

List for Calculating Voltage Drops Occurring at Extension Cables when connecting Q6□B between Q3□B and Q5□B

| Position of extension base unit | | Voltage drop caused by extension cable from the main base unit to the Q5□B IN connector (V) |
|---|---|---|
| Q6□B | Q5□B | |
| Extension stage 1 | Extension stage 2 | V=(R1+R2)I1 |
| Extension stage 1, Extension stage 2 | Extension stage 3 | V=(R1+R2+R3)I1 |
| Extension stage 1 to 3 | Extension stage 4 | V=(R1+R2+R3+R4)I1 |
| Extension stage 1 to 4 | Extension stage 5 | V=(R1+R2+R3+R4+R5)I1 |
| Extension stage 1 to 5 | Extension stage 6 | V=(R1+R2+R3+R4+R5+R6)I1 |
| Extension stage 1 to 6 | Extension stage 7 | V=(R1+R2+R3+R4+R5+R6+R7)I1 |

The voltage supplied to the "IN" connector of the Q5□B reaches 4.75 VDC or higher on the condition that the voltage drop (V) at the extension cable between the main base unit and Q5□B is 0.15 VDC or lower.

### (3) When the GOT is bus-connected

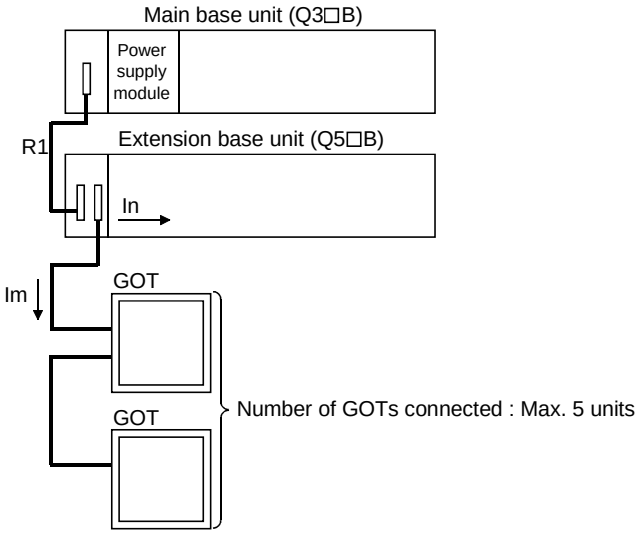
#### (a) Selection condition

4.75VDC or higher should be supplied to the "IN" connector of the Q5□B.

#### (b) How to calculate voltage to "IN" connector

The 5VDC output voltage of the power supply module on the main base unit is set to at least 4.90VDC.

Therefore, the Q5□B can be used if the voltage drop is 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).




| Extension Cable Type | Extension Cable Conductor Resistance (Ω) |
|---|---|
| QC05B | 0.044 |
| QC06B | 0.051 |
| QC12B | 0.082 |
| QC30B | 0.172 |
| QC50B | 0.273 |
| QC100B | 0.530 |

| Symbol | Description |
|---|---|
| V | Voltage drop at the extension cable between the main base unit and Q5□B extension base unit |
| In | 5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 5, n: Extension No. of the Q6□B connected<br>(Sum total of current consumed by Q5□B and currents consumed by I/O, intelligent function modules loaded on the Q5□B) |
| Im | 5VDC current consumption of the GOT (current consumption per GOT is 254mA)<br>• Im = 254 × c (c: Number of GOTs connected (c: 1 to 5)) |
| Rn | Extension cable resistance between the main base unit (or the Q6□B extension base unit) and Q6□B extension base unit |
| Rn+1 | Extension cable resistance between the Q6□B extension base unit and Q5□B extension base unit |

POINT

When connecting GOT by extension cable that is 13.2 m (43.31ft) or longer, the bus extension connector box A9GT-QCNB is required.
Since the A9GT-QCNB is supplied with 5VDC from the power supply module loaded on the main base unit, 29mA must be added to "Im" as the current consumption of the A9GT-QCNB.
For details of the GOT-bus connection, refer to the GOT-A900 Series User's Manual (Connection).

# 7. MEMORY CARD AND BATTERY

This section describes the specifications and handling of the memory card and battery which can be used on the Process CPU.
The memory card is necessary for sampling tracing.
The memory card is also used to handle file registers of more than the number of points that can be stored in the standard RAM. (Refer to Section 4.1)

## 7.1 Memory Card Specifications

The specifications of the memory card which can be used on the Process CPU adheres to the PCMCIA small PC card.
On the Process CPU, only one memory card can be installed.

### (1) SRAM card

| Item \ Type | | Q2MEM-1MBS | Q2MEM-2MBS |
|---|---|---|---|
| Memory capacity after format | | 1011.5 kbyte | 2034 kbyte |
| Storable number of files | | 256 | 288 |
| Number of insertions and extractions | | 5000 times | |
| External dimensions | H | 45mm (1.77inch) | |
| | W | 42.8mm (1.69inch) | |
| | D | 3.3mm (0.13inch) | |
| Weight | | 15g | |

### (2) Flash card

| Item \ Type | | Q2MEM-2MBF | Q2MEM-4MBF |
|---|---|---|---|
| Memory capacity after format | | 2035 kbyte | 4079 kbyte |
| Storable number of files | | 288 | |
| Number of insertions and extractions | | 5000 times | |
| Number of writings | | 100000 times | |
| External dimensions | H | 45mm (1.77inch) | |
| | W | 42.8mm (1.69inch) | |
| | D | 3.3mm (0.13inch) | |
| Weight | | 15g | |

### (3) ATA card

| Item \ Type | | Q2MEM-8MBA | Q2MEM-16MBA | Q2MEM-32MBA |
|---|---|---|---|---|
| Memory capacity after format | | 7940 kbyte | 15932 kbyte | 31854 kbyte |
| Storable number of files | | 512 | | |
| Number of insertions and extractions | | 5000 times | | |
| Number of writings | | 1000000 times | | |
| External dimensions | H | 45mm (1.77inch) | | |
| | W | 42.8mm (1.69inch) | | |
| | D | 3.3mm (0.13inch) | | |
| Weight | | 15g | | |

## 7.2 Battery Specifications (For CPU Module and SRAM Card)

### (1) For CPU module

| Item \ Type | Q6BAT |
|---|---|
| Classification | Manganese dioxide lithium primary battery |
| Initial voltage | 3.0V |
| Nominal current | 1800mAh |
| Storage life | 10 years (room temperature) |
| Total power interrupt time | Refer to Section 10.3.1. |
| Application | Power failure backup for program memory, standard RAM and latch devices |

### (2) For SRAM card

| Item \ Type | Q2MEM-BAT |
|---|---|
| Classification | Graphite fluoride primary battery |
| Initial voltage | 3.0V |
| Nominal current | 48mAh |
| Storage life | 5 years (room temperature) |
| Total power interrupt time | Refer to Section 10.3.1. |
| Application | Power failure backup for SRAM card |



REMARK

Refer to Section 10.3.1 for the service life of the battery.


7 - 2

## 7.3 Handling the Memory Card

### (1) Formatting of memory card

Any SRAM or ATA card used on the Process CPU must have been formatted
Since the SRAM or ATA card purchased is not yet formatted, format it using GX Developer before use.
(The Flash card need not be formatted.)
For the formatting procedure, see the Operating Manual of the GX Developer.

### (2) Installation of SRAM card battery

A power interrupt hold-on battery is furnished with the SRAM card you purchased.
Before using the SRAM card, install the battery.

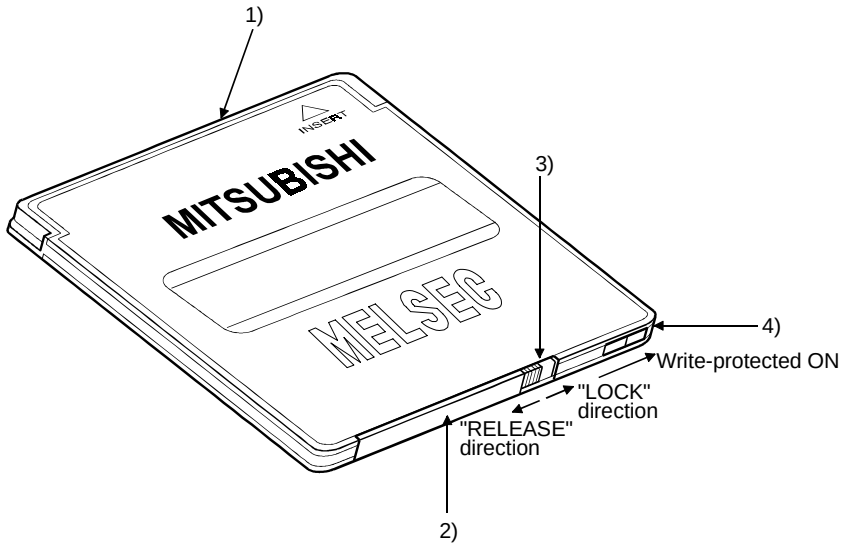
| POINTS |
| --- |
| Even if the battery is installed on the CPU module, if a battery is not installed on the SRAM card, the memory of the SRAM card will not be backed up. Ensure to install the battery on the SRAM card.<br>Also, if the battery is installed on the SRAM card but the CPU module has no battery, the program memory, standard RAM and latch devices of the CPU module are not backed up. Similarly ensure to install the battery on the CPU module. |

### (3) Kind of file which can be stored on memory card

Please refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals) of section 6.1 for the kind of the file which can be stored on each memory card.

## 7.4 The Names of The Parts of The Memory Card

The names of the parts of the memory card are described below.



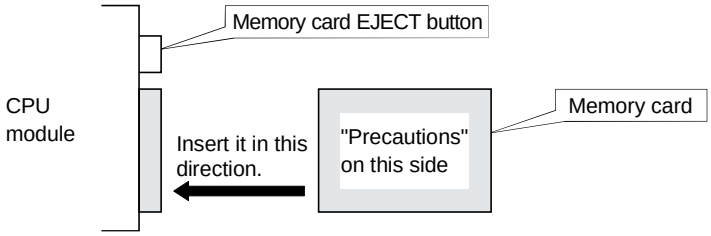

| No. | Name | Descriptions |
|---|---|---|
| 1) | Connector section | Connector section connected to the CPU module |
| 2) | Battery holder | Used to set the lithium battery for data backup of the SRAM memory<br>(SRAM card only) |
| 3) | Battery holder fixing switch * | Switch for fixing the battery holder to the memory card main module<br>Locked at LOCK position (write protect switch side)<br>LOCK: Locked, RELEASE: Unlocked<br>(SRAM card only) |
| 4) | Write protect switch | Used to set write inhibit in the memory. At the time of shipping, it is set at OFF.<br>(SRAM card and Flash card only)<br>ON: Data write inhibited<br>OFF: Data write enabled |

*: The battery holder fixing switch is returned automatically from RELEASE to LOCK when the battery holder is disconnected.

## 7.5 Memory Card Loading/Unloading Procedures

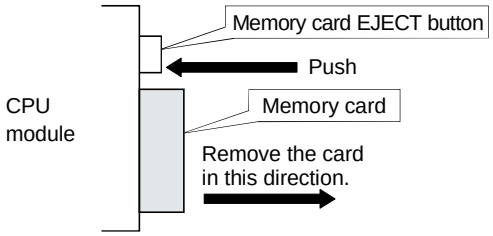
### (1) To install the memory card

Install the memory card into the CPU module, while paying attention to the orientation of the memory card. Insert the memory card securely into the connector until the height of the memory card reaches that of the memory card EJECT button.




### (2) To remove the memory card

To remove the memory card from the CPU module, press the memory card EJECT button to push out the card.




### (3) To extract the memory card while the power is turned on

Before removing the memory card, make sure that the special relays "SM604", "SM605" are OFF.

- When "SM604" is ON, the memory card cannot be removed since the CPU module is using the memory card.
- When "SM605" is ON, turn it OFF.
  When "SM604" and "SM605" are OFF, remove the memory card in the following procedure.

1) Turn ON the special relay "SM609" using the sequence program or by the device test of the peripheral devices.
2) By monitoring the peripheral devices, check that the special relays "SM600" is turned OFF.
3) Extract the memory card.

∗ SM600 (Memory card usable flag) : The system is turned on when memory card is ready for use by user.
SM604 (memory card use flag) : The system is turned on when the CPU module uses a memory card.
SM605 (memory card detach inhibit flag) : This is turned on by the user to disable the memory card from being detached.

### (4) To install the memory card while the power is turned ON

1) Install the memory card.
2) By monitoring the peripheral devices, check that the special relays "SM600" is turned ON.

**POINTS**

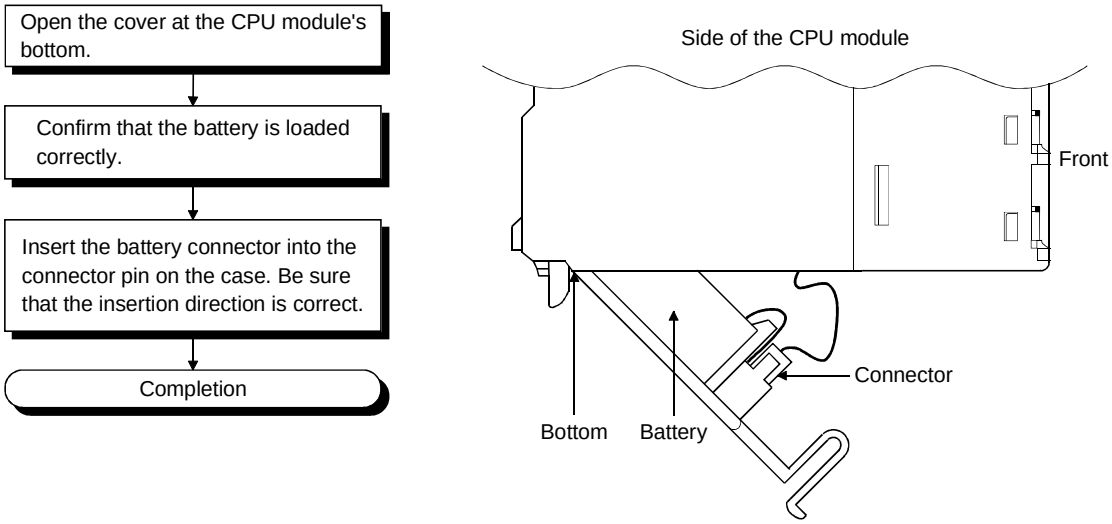
Install and remove the memory card while the power is turned on, paying attention to the following.

(1) If the procedures specified above are not followed, the data stored in the memory card may be destroyed.
When the CPU module operation at the time of occurrence of a parameter error is set to STOP, the CPU module operation is stopped by the occurrence of "ICM.OPE.ERROR."

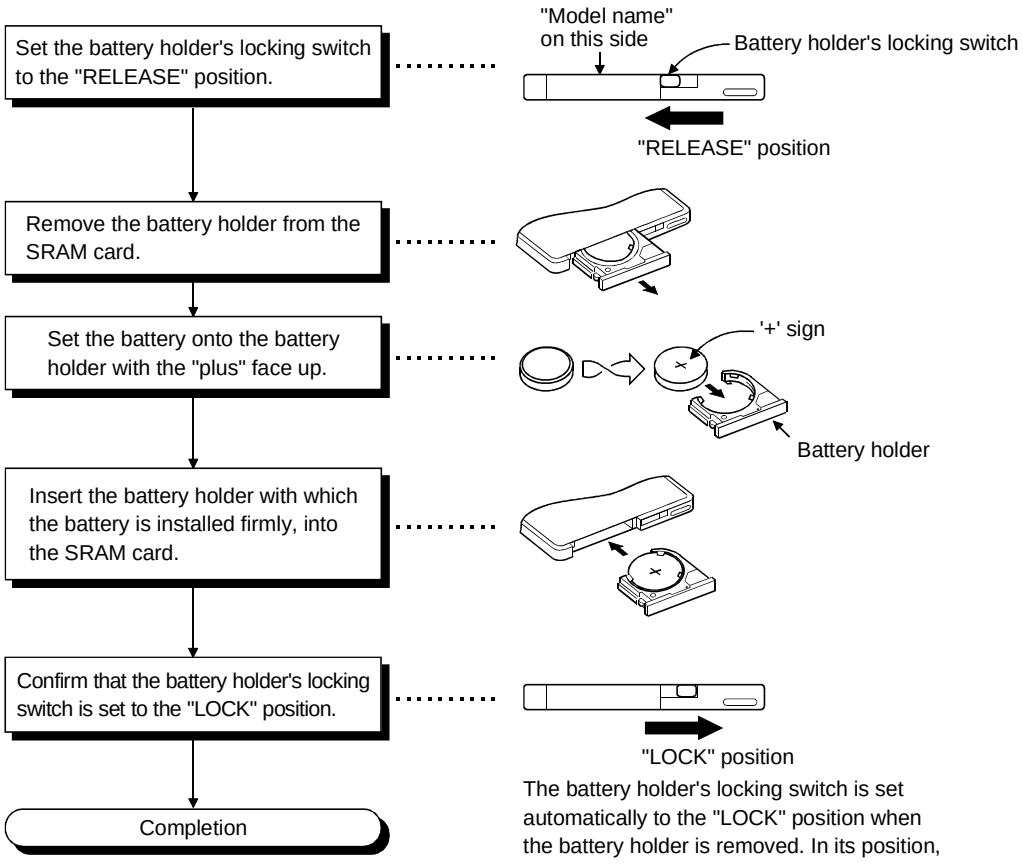
(2) When the memory card is installed, its mount processing is performed again. As a result, the scanning time is increased by several 10 ms max.

## 7.6 Installation of Battery (for CPU Module and Memory Card)

(1) The battery for the CPU module is shipped with its connector disconnected.
Connect the connector as follows.
Refer to Section 10.3 for the service life of the battery and how to replace the battery.


Open the cover at the CPU module's bottom.
Confirm that the battery is loaded correctly.
Insert the battery connector into the connector pin on the case. Be sure that the insertion direction is correct.
Completion
Side of the CPU module
Front
Connector
Bottom
Battery

(2) The battery for the SRAM card is shipped separately from the battery holder.
Before installing the SRAM card into the CPU module, set the battery holder in the following procedure.


Set the battery holder's locking switch to the "RELEASE" position.
"Model name" on this side
Battery holder's locking switch
"RELEASE" position
Remove the battery holder from the SRAM card.
Set the battery onto the battery holder with the "plus" face up.
'+' sign
Battery holder
Insert the battery holder with which the battery is installed firmly, into the SRAM card.
Confirm that the battery holder's locking switch is set to the "LOCK" position.
"LOCK" position
Completion

The battery holder's locking switch is set automatically to the "LOCK" position when the battery holder is removed. In its position, insert the battery holder firmly.

# 8. EMC AND LOW VOLTAGE DIRECTIVE

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directive, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directive, has been a legal obligation since 1997.
Manufacturers who recognize their products must conform to the EMC and Low Voltage Directive required to declare that their products conform to these Directives and put a "CE mark" on their products.

## 8.1 Requirements for conformance to EMC Directive

The EMC Directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".
The applicable products are requested to meet these requirements. The sections 8.1.1 through 8.1.6 summarize the precautions on conformance to the EMC Directive of the machinery constructed using the MELSEC-Q series PLCs.
The details of these precautions has been prepared based on the control requirements and the applicable standards control. However, we will not assure that the overall machinery manufactured according to these details conforms to the above-mentioned directives. The method of conformance to the EMC Directive and the judgment on whether or not the machinery conforms to the EMC Directive must be determined finally by the manufacturer of the machinery.

### 8.1.1 Standards applicable to the EMC Directive

The standards applicable to the EMC Directive are listed below.

| Specification | Test item | Test details | Standard value |
|---|---|---|---|
| EN50081-2 : 1995 | EN55011<br>Radiated noise ∗2 | Electromagnetic emissions from the product are measured. | 30 M-230 MHz QP : 30 dB μ V/m<br>(30 m in measurement range) ∗1<br>230 M-1000 MHz QP : 37 dB μ V/m<br>(30 m in measurement range) |
| | EN55011<br>Conducted noise | Electromagnetic emissions from the product to the power line is measured. | 150 k-500 kHz QP : 79 dB, Mean : 66 dB ∗1<br>500 k-30 MHz QP : 73 dB, Mean : 60 dB |
| EN61131-2 : 1996 | EN61000-4-2<br>Electrostatic immunity ∗2 | Immunity test in which static electricity is applied to the cabinet of the equipment. | 15 k V Aerial discharge |
| | EN61000-4-4<br>Fast transient burst noise ∗2 | Immunity test in which burst noise is applied to the power line and signal lines. | Power line : 2 kV<br>Digital I/O (24 V or higher) : 1 kV<br>(Digital I/O (24 V or less)) > 250 V<br>(Analog I/O, signal lines) > 250 V |
| | EN61000-4-3<br>Radiated field AM modulation ∗2 | Immunity test in which field is irradiated to the product. | 10 V/m, 26-1000 MHz,<br>80%AM modulation@1 kHz |
| | EN61000-4-12<br>Damped oscillatory wave immunity | Immunity test in which a damped oscillatory wave is superimposed on the power line. | Power line : 1 kV<br>Digital I/O (24 V or higher) : 1 kV |

(∗1) QP : Quasi-peak value, Mean : Average value
(∗2) The PLC is an open type device (device installed to another device) and must be installed in a conductive control panel.
The tests for the corresponding items were performed while the PLC was installed inside a control panel.

### 8.1.2 Installation instructions for EMC Directive

The PLC is open equipment and must be installed within a control cabinet for use. This not only ensures safety but also ensures effective shielding of PLC-generated electromagnetic noise.

#### (1) Control cabinet

(a) Use a conductive control cabinet.

(b) When attaching the control cabinet's top plate or base plate, mask painting and weld so that good surface contact can be made between the cabinet and plate.

(c) To ensure good electrical contact with the control cabinet, mask the paint on the installation bolts of the inner plate in the control cabinet so that contact between surfaces can be ensured over the widest possible area.

(d) Earth the control cabinet with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.

(e) Holes made in the control cabinet must be 10 cm (3.94 inch) diameter or less. If the holes are 10 cm (3.94 inch) or larger, radio frequency noise may be emitted.
In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable.
The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.
Our tests have been carried out on a panel having the damping characteristics of 37 dB max. and 30 dB mean (measured by 3 m method with 30 to 300 MHz).

#### (2) Connection of power and earth wires

Earthing and power supply wires for the PLC system must be connected as described below.

(a) Provide an earthing point near the power supply module. Earth the power supply's LG and FG terminals (LG : Line Ground, FG : Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30 cm (11.81 inch) or shorter.) The LG and FG terminals function is to pass the noise generated in the PLC system to the ground, so an impedance that is as low as possible must be ensured. As the wires are used to relieve the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.

(b) The earth wire led from the earthing point must be twisted with the power supply wires. By twisting with the earthing wire, noise flowing from the power supply wires can be relieved to the earthing. However, if a filter is installed on the power supply wires, the wires and the earthing wire may not need to be twisted.

## 8.1.3 Cables

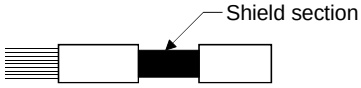
The cables extracted from the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise. To prevent noise emission, use shielded cable for the cables which are connected to the I/O modules and intelligent function modules and may be extracted to the outside of the control panel.
The use of a shielded cable also increases noise resistance. The signal lines connected to the PLC I/O modules and intelligent function modules use shielded cables to assure noise resistance under the conditions where the shield is earthed. If a shielded cable is not used or not earthed correctly, the noise resistance will not meet the specified requirements.

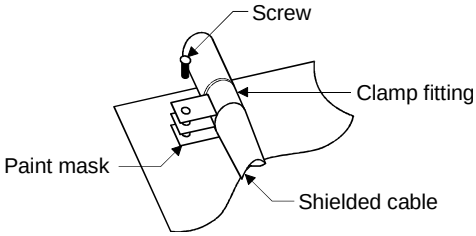
When the shield of a shielded cable is earthed to the cabinet body, please ensure that the shield contact with the body is over a large surface area. If the cabinet body is painted it will be necessary to remove paint from the contact area. All fastenings must be metallic and the shield and earthing contact must be made over the largest available surface area. If the contact surfaces are too uneven for optimal contact to be made either use washers to correct for surface inconsistencies or use an abrasive to level the surfaces. The following diagrams show examples of how to provide good surface contact of shield earthing by use of a cable clamp.

### (1) Earthing of shielded of shield cable

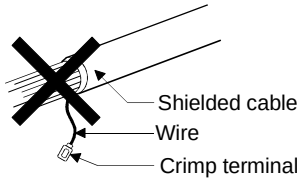
(a) Earth the shield of the shielded cable as near the module as possible taking care so that the earthed cables are not induced electromagnetically by the cable to be earthed.

(b) Take an appropriate measures so that the shield section of the shielded cable from which the outer cover was partly removed for exposure is earthed to the control panel on an increased contact surface. A clamp may also be used as shown in the figure below. In this case, however, apply a cover to the painted inner wall surface of the control panel which comes in contact with the clamp.



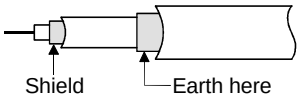




Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



### (2) MELSECNET/H module

Always use a double-shielded coaxial cable (MITSUBISHI CABLE INDUSTRIES, LTD.: 5C-2V-CCY) for the coaxial cables MELSECNET/H module. Radiated noise in the range of 30MHz or higher can be suppressed by use of the double-shielded coaxial cables. Earth the double-shielded coaxial cable by connecting its outer shield to the ground.

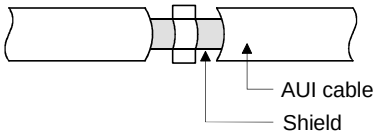



Refer to (1) for the earthing of the shield.

### (3) Ethernet module

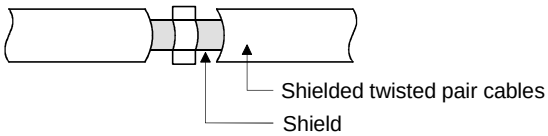
Precautions for using AUI cables, twisted pair cables and coaxial cables are described below.

(a) Always earth the AUI cables connected to the 10BASE5 connectors. Because the AUI cable is of the shielded type, strip part of the outer cover and earth the exposed shield section to the ground on the widest contact surface as shown below.



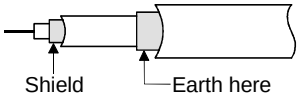

Refer to (1) for the earthing of the shield.

(b) Use shielded twisted pair cables as the twisted pair cables connected to the 10BASE-T connectors. For the shielded twisted pair cables, strip part of the outer cover and earth the exposed shield section to the ground on the widest contact surface as shown below.




Refer to (1) for the earthing of the shield.

(c) Always use double-shielded coaxial cables as the coaxial cables connected to the 10BASE2 connectors. Earth the double-shielded coaxial cable by connecting its outer shield to the ground.




Refer to (1) for the earthing of the shield.

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### (4) I/O signal lines and other communication cables

For the I/O signal lines and other communication cables lines (RS-232, RS-422, CC-Link, etc.), if extracted to the outside of the control panel, also ensure to earth the shield section of these lines and cables in the same manner as in item (1) above.

### 8.1.4 Power supply module

Always ground the LG and FG terminals after short-circuiting them.

### 8.1.5 Others

#### (1) Ferrite core

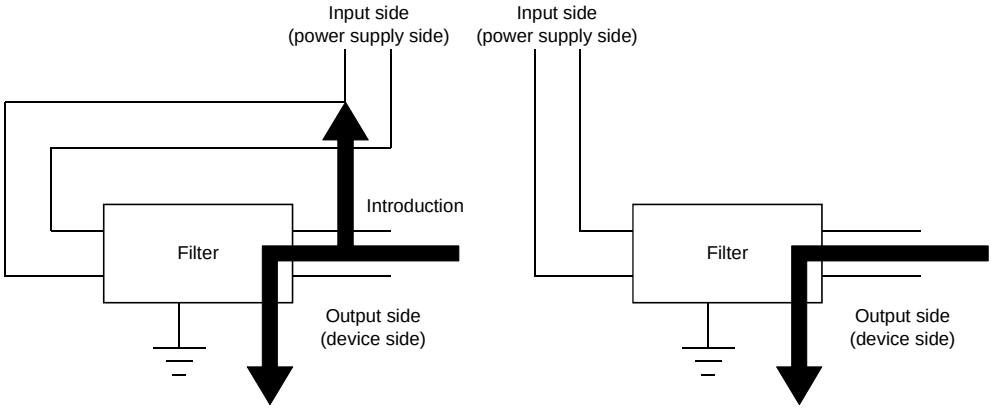
A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.
It is not required to fit ferrite cores to cables, but it is recommended to fit ferrite cores if shield cables pulled out of the enclosure do not provide sufficient shielding effects.
It should be noted that the ferrite cores should be fitted to the cables in the position immediately before they are pulled out of the enclosure. If the fitting position is improper, the ferrite will not produce any effect.
In the CC-Link system, however, ferrite cores cannot be fitted to cables.

#### (2) Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise.
It is not required to fit the noise filter to the power supply line, but fitting it can further suppress noise.
(The noise filter has the effect of reducing conducted noise of 10 MHz or less.)

The precautions required when installing a noise filter are described below.

(a) Do not bundle the wires on the input side and output side of the noise filter. When bundled, the output side noise will be induced into the input side wires from which the noise was filtered.




1) The noise will be included when the input and output wires are bundled.

2) Separate and lay the input and output wires.

(b) Earth the noise filter earthing terminal to the control cabinet with the shortest wire possible (approx. 10 cm (3.94 inch)).

Reference

| Noise Filter Model Name | FN343-3/01 | FN660-6/06 | ZHC2203-11 |
|---|---|---|---|
| Manufacturer | SCHAFFNER | SCHAFFNER | TDK |
| Rated current | 3 A | 6 A | 3 A |
| Rated voltage | 250 V | | |

## 8.2 Requirement to Conform to the Low Voltage Directive

The Low Voltage Directive requires each device that operates with the power supply ranging from 50 to 1000VAC and 75 to 1500VDC to satisfy the safety requirements. In Sections 8.2.1 to 8.2.6, cautions on installation and wiring of the MELSEC-Q series PLC to conform to the Low Voltage Directive are described.
We have put the maximum effort to develop this material based on the requirements and standards of the regulation that we have collected. However, compatibility of the devices which are fabricated according to the contents of this manual to the above regulation is not guaranteed. Each manufacturer who fabricates such device should make the final judgement about the application method of the Low Voltage Directive and the product compatibility.

### 8.2.1 Standard applied for MELSEC-Q series PLC

The standard applied for MELSEC-Q series PLC is EN61010-1 safety of devices used in measurement rooms, control rooms, or laboratories.

The MELSEC-Q series PLC modules which operate at the rated voltage of 50VAC/75VDC or above are also developed to conform to the above standard.
The modules which operate at the rated voltage of less than 50VAC/75VDC are out of the Low Voltage Directive application range.

### 8.2.2 MELSEC-Q series PLC selection

(1) Power supply module

There are dangerous voltages (voltages higher than 42.4V peak) inside the power supply modules of the 100/200VAC rated I/O voltages. Therefore, the CE marked models are enhanced in insulation internally between the primary and secondary.

(2) I/O module

There are dangerous voltages (voltages higher than 42.4V peak) inside the I/O modules of the 100/200VAC rated I/O voltages. Therefore, the CE marked models are enhanced in insulation internally between the primary and secondary.
The I/O modules of 24VDC or less rating are out of the Low Voltage Directive application range.

(3) CPU module, memory card, base unit

Using 5VDC circuits inside, the above modules are out of the Low Voltage Directive application range.

(4) Intelligent function modules (special function modules)

The intelligent function modules (special function modules) such as the analog, network and positioning modules are 24VDC or less in rated voltage and are therefore out of the Low Voltage Directive application range.

(5) Display device

Use the CE marked display device.

### 8.2.3 Power supply

The insulation specification of the power supply module was designed assuming installation category II. Be sure to use the installation category II power supply to the PLC.
The installation category indicates the durability level against surge voltage generated by a thunderbolt. Category I has the lowest durability; category IV has the highest durability.

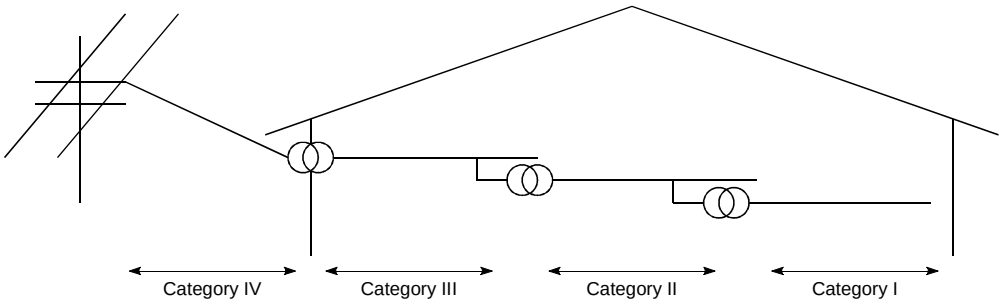



Figure 8.1: Installation Category

Category II indicates a power supply whose voltage has been reduced by two or more levels of isolating transformers from the public power distribution.

### 8.2.4 Control box

Because the PLC is an open device (a device designed to be stored within another module), be sure to use it after storing in the control box.

#### (1) Electrical shock prevention

In order to prevent persons who are not familiar with the electric facility such as the operators from electric shocks, the control box must have the following functions :

(a) The control box must be equipped with a lock so that only the personnel who has studied about the electric facility and have enough knowledge can open it.
(b) The control box must have a structure which automatically stops the power supply when the box is opened.

#### (2) Dustproof and waterproof features

The control box also has the dustproof and waterproof functions. Insufficient dustproof and waterproof features lower the insulation withstand voltage, resulting in insulation destruction. The insulation in our PLC is designed to cope with the pollution level 2, so use in an environment with pollustion level 2 or below.

Pollution level 1 : An environment where the air is dry and conductive dust does not exist.
Pollution level 2 : An environment where conductive dust does not usually exist, but occasional temporary conductivity occurs due to the accumulated dust. Generally, this is the level for inside the control box equivalent to IP54 in a control room or on the floor of a typical factory.
Pollution level 3 : An environment where conductive dust exits and conductivity may be generated due to the accumulated dust. An environment for a typical factory floor.
Pollution level 4 : Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

As shown above, the PLC can realize the pollution level 2 when stored in a control box equivalent to IP54.

### 8.2.5 Grounding

There are the following two different grounding terminals. Use either grounding terminal in an earthed status.

Protective grounding : Maintains the safety of the PLC and improves the noise resistance.

Functional grounding : Improves the noise resistance.

### 8.2.6 External wiring

#### (1) 24VDC external power supply

For the MELSEC-Q series PLC 24VDC I/O modules and the intelligent function modules (special function modules) which require external supply power, use a model whose 24VDC circuit is intensively insulated from the hazardous voltage circuit.

#### (2) External devices

When a device with a hazardous voltage circuit is externally connected to the PLC, use a model whose circuit section of the interface to the PLC is intensively insulated from the hazardous voltage circuit.

#### (3) Intensive insulation

Intensive insulation refers to the insulation with the dielectric withstand voltage shown in Table 8.1.

Table 8.1 : Intensive Insulation Withstand Voltage
(Installation Category II, source : IEC664)

| Rated voltage of hazardous voltage area | Surge withstand voltage (1.2/50 μs) |
|---|---|
| 150VAC or below | 2500 V |
| 300VAC or below | 4000 V |

# 9. LOADING AND INSTALLATION

In order to increase the reliability of the system and exploit the maximum performance of its functions, this section describes the methods and precautions for the mounting and installation of the system.

## 9.1 General Safety Requirements

**⚠ DANGER**

- Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.
  (1) Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.
  (2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.
  (a) The power supply module has over current protection equipment and over voltage protection equipment.
  (b) The PLC CPUs self-diagnostic functions, such as the watchdog timer error, detect problems.
  In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller.
  (3) Output could be left on or off when there is trouble in the outputs module relay or transistor. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.
- When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.
- Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.
- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Not doing so could result in erroneous output or erroneous operation.operating status of each station. Not doing so could result in erroneous output or erroneous operation.




9 - 1

**DANGER**

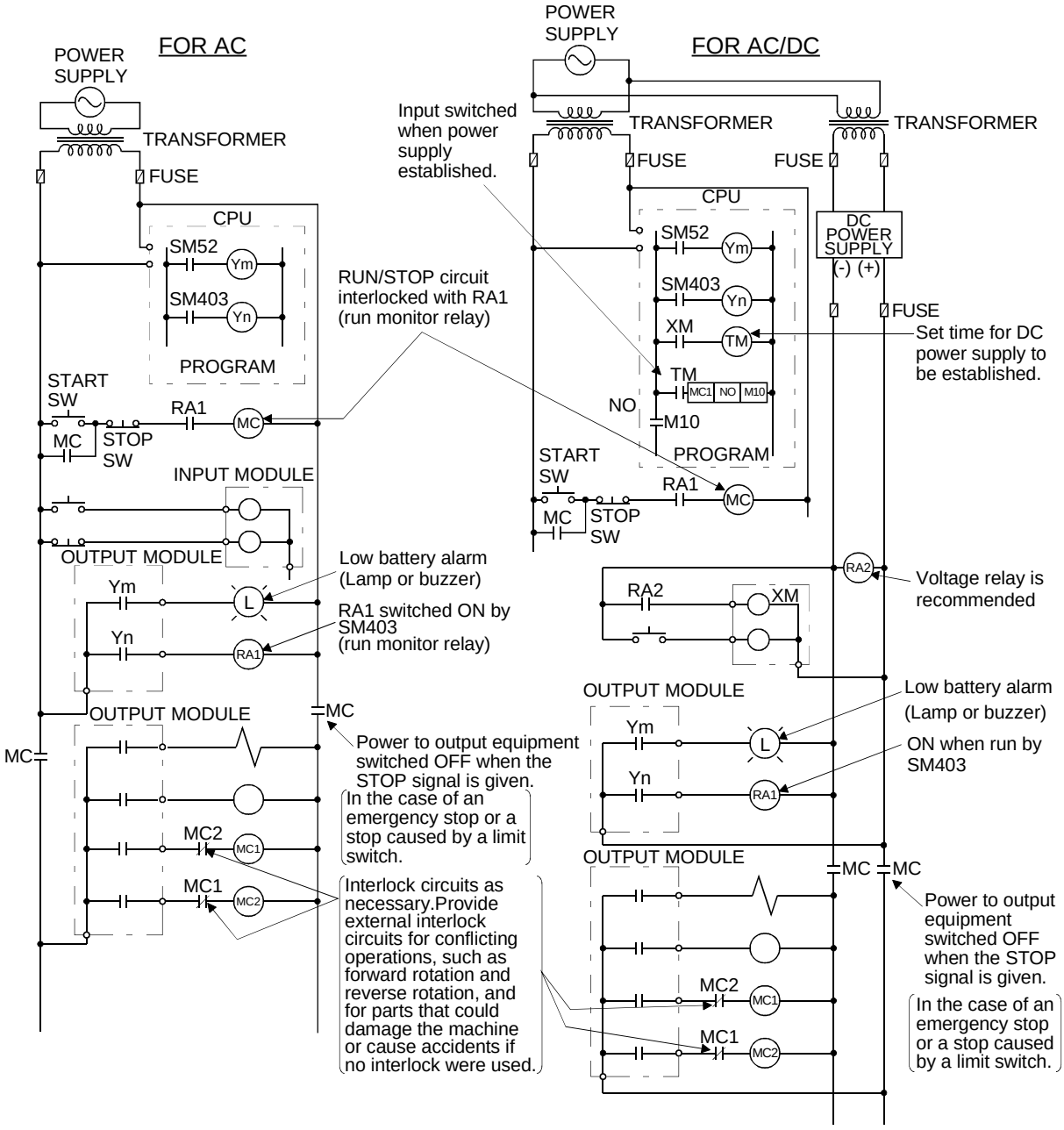
- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the special function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.
  Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.
  Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.
  In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

**CAUTION**

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other.
  Not doing so could result in noise that would cause erroneous operation.
- When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON. Take measures such as replacing the module with one having sufficient rated current.

When the PLC power supply is switched ON-OFF, correct control output may not be performed temporarily due to differences in delay time and starting time between the PLC power supply and the external power supply for the controlled object (especially DC).
For example, if the external power supply for the controlled object is switched on in a DC output module and then the PLC power supply is switched on, the DC output module may provide false output instantaneously at power-on of the PLC. Therefore, it is necessary to make up a circuit that can switch on the PLC power supply first.
Also, an abnormal operation may be performed if an external power supply fault or PLC failure takes place.
To prevent any of these abnormal operations from leading to the abnormal operation of the whole system and in a fail-safe viewpoint, areas which can result in machine breakdown and accidents due to abnormal operations (e.g. emergency stop, protective and interlock circuits) should be constructed outside the PLC.
The following page gives examples of system designing in the above viewpoint.

(1) System design circuit example (when not using $\overline{\text{ERR}}$ contact of power supply module)




The power-ON procedure is as follows:

For AC

1) Switch power ON.
2) Set CPU to RUN.
3) Turn ON the start switch.
4) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

For AC/DC

1) Switch power ON.
2) Set CPU to RUN.
3) When DC power is established, RA2 goes ON.
4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5 seconds.)
5) Turn ON the start switch.
6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)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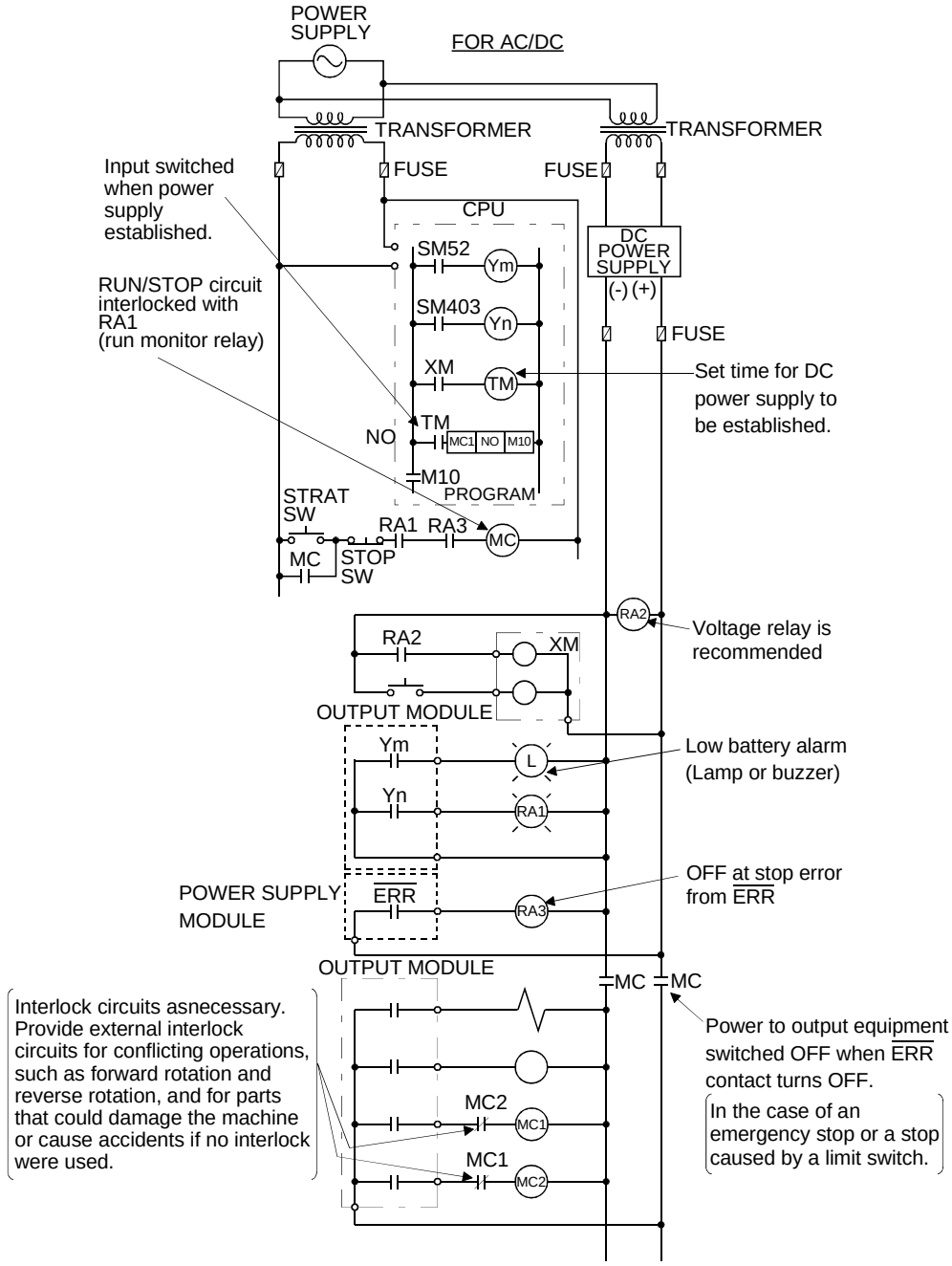
(2) System design circuit example (when using $\overline{\text{ERR}}$ contact of power supply module)




The power-ON procedure is as follows:

For AC/DC
1) Switch power ON.
2) Set CPU to RUN.
3) When DC power is established, RA2 goes ON.
4) Timer (TM) times out after the DC power reaches 100%. (The TM set value should be the period of time from when RA2 goes ON to the establishment of 100% DC voltage. Set this value to approximately 0.5s.)
5) Turn ON the start switch.
6) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program. (If a voltage relay is used at RA2, no timer (TM) is required in the program.)

### (3) Fail-safe measures against failure of the PLC

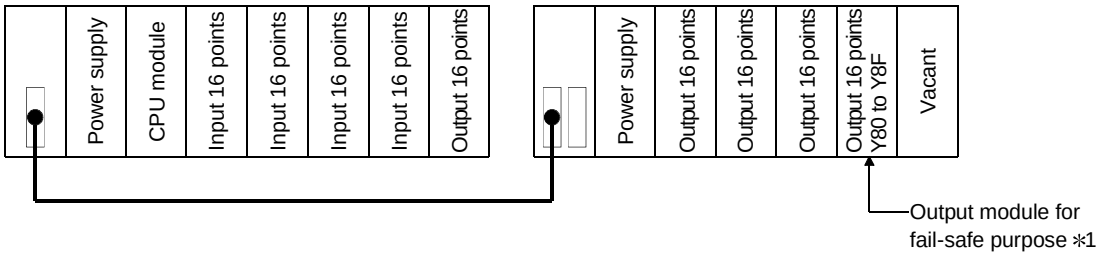
Failure of a CPU module or memory can be detected by the self diagnosis function. However, failure of I/O control area may not be detected by the CPU module.

In such cases, all I/O points turn ON or OFF depending on a condition of problem, and normal operating conditions and operating safety cannot sometimes be maintained.

Though Mitsubishi PLCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecific reasons. To prevent the abnormal operation of the whole system, machine breakdown, and accidents, fail-safe circuitry against failure of the PLC must be constructed outside the PLC.

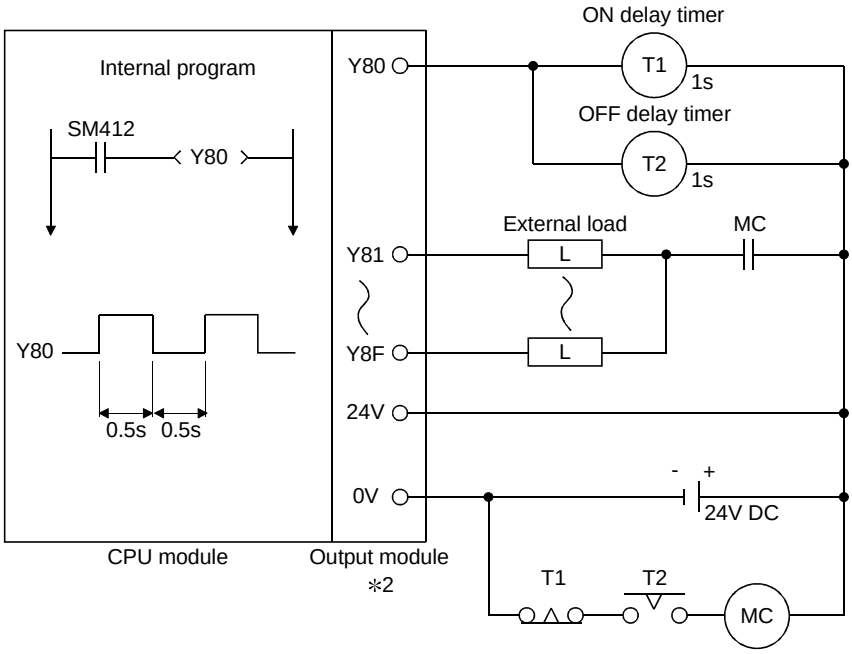
Examples of a system and its fail-safe circuitry are described below:

<System example>




∗1: The output module for fail-safe purpose should be loaded in the last slot of the system. (Y80 to Y8F in the above system.)

<Fail-safe circuit example>




∗2: Y80 repeats turning ON and then OFF at 0.5s intervals.
Use a no-contact output module (transistor in the example shown above).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## 9.2 Calculating Heat Generation by PLC

The ambient temperature inside the board storing the PLC must be suppressed to a PLC usable ambient temperature of 55°C.
For the design of radiation from the storing board, it is necessary to know the average power consumption (heating value) of the devices and instruments stored in the board. Here the method of obtaining the average power consumption of the PLC system is described.
From the power consumption, calculate a rise in ambient temperature inside the board.

How to calculate average power consumption

The power consuming parts of the PLC are roughly classified into six blocks as shown below.

(1) Power consumption of power supply module
The power conversion efficiency of the power supply module is approx. 70 %, i.e., 30 % of the output power is consumed by heating. As a result, 3/7 of the output power becomes the power consumption.
Therefore the calculation formula is as follows.

$$Wpw = \frac{3}{7} \times (I_{5V} \times 5) \text{ (W)}$$

$I_{5V}$: Current consumption of logic 5 VDC circuit of each module

(2) Power consumption of a total of 5 VDC logic section of each module
The power consumption of the 5 VDC output circuit section of the power supply module is the power consumption of each module (including the current consumption of the base unit).

$W_{5V} = I_{5V} \times 5$ (W)

(3) A total of 24 VDC average power consumption of the output module (power consumption for simultaneous ON points)
The average power of the external 24 VDC power is the total power consumption of each module.

$W_{24V} = I_{24V} \times 24$ (W)

(4) Average power consumption due to voltage drop in the output section of the output module
(Power consumption for simultaneous ON points)

$W_{OUT} = I_{OUT} \times$ Vdrop $\times$ Number of outputs $\times$ Simultaneous ON rate (W)

$I_{OUT}$ : Output current (Current in actual use) (A)
Vdrop : Voltage drop in each output module (V)

(5) Average power consumption of the input section of the input module(Power consumption for simultaneous ON points)

$W_{IN} = I_{IN} \times E \times$ Number of input points $\times$ Simultaneous ON rate (W)

$I_{IN}$ : Input current (Effective value for AC) (A)
E : Input voltage (Voltage in actual use) (V)

(6) Power consumption of the power supply section of the intelligent function module

$W_S = I_{5V} \times 5 + I_{24V} \times 24 + I_{100V} \times 100$ (W)

The total of the power consumption values calculated for each block becomes the power consumption of the overall sequencer system.

$W = W_{PW} + W_{5V} + W_{24V} + W_{OUT} + W_{IN} + W_S$ (W)

From this overall power consumption (W), calculate the heating value and a rise in ambient temperature inside the board.
The outline of the calculation formula for a rise in ambient temperature inside the board is shown below.

$$T = \frac{W}{UA} (°C)$$

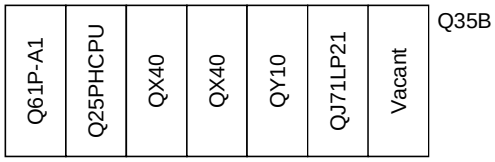
W : Power consumption of overall sequencer system (value obtained above)
A : Surface area inside the board
U : When the ambient temperature inside the board is uniformed by a fan ..... 6
When air inside the board is not circulated ..... 4

**POINT**

When a rise in ambient temperature inside the board exceeds the specified limit, it is recommended that you install a heat exchanger in the board to lower the ambient temperature inside the board.
If a normal ventilating fan is used, dust will be sucked into the PLC together with the external air, and it may affect the performance of the PLC.

(7) Example of calculation of average power consumption

(a) System configuration




(b) 5 VDC current consumption of each module

| | |
|---|---|
| Q25PHCPU | : 0.64 (A) |
| QX40 | : 0.05 (A) |
| QY10 | : 0.43 (A) |
| QJ71LP21 | : 0.55 (A) |
| Q35B | : 0.074 (A) |

(c) Power consumption of power supply module
$W_{PW} = 3/7 \times (0.64+0.05+0.05+0.43+0.55+0.074) \times 5) = 3.84$ (W)

(d) Power consumption of a total of 5 VDC logic section of each module
$W_{5V} = (0.64+0.05+0.05+0.43+0.55+0.074) \times 5) = 8.97$ (W)

(e) A total of 24 VDC average power consumption of the output module
$W_{24V} = 0$ (W)

(f) Average power consumption due to voltage drop in the output section of the output module

$W_{OUT}$ = 0 (W)

(g) Average power consumption of the input section of the input module

$W_{IN} = 0.004 \times 24 \times 32 \times 1 = 3.07$ (W)

(h) Power consumption of the power supply section of the intelligent function module

$W_S$ = 0 (W)

(i) Power consumption of overall system.

W = 3.84 + 8.97 + 0 + 0 + 3.07 + 0 = 15.88 (W)

## 9.3 Module Installation

### 9.3.1 Precaution on installation

**⚠ CAUTION**

- Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Hold down the module loading lever at the module bottom, and securely insert the module fixing latch into the fixing hole in the base unit. Incorrect loading of the module can cause a malfunction, failure or drop. When using the PLC in the environment of much vibration, tighten the module with a screw.
  Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- When installing more cables, be sure that the base unit and the module connectors are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.
- Securely load the memory card by pushing it into the memory card loading slot. Make a check after loading. Not doing so can cause a malfunction due to a contact fault.
- Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure. For details, refer to the section of online module change in this manual.
- Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.

This section gives instructions for handling the CPU, I/O, intelligent function and power supply modules, base units and so on.

(1) Module enclosure, terminal block connectors and pin connectors are made of resin; do not drop them or subject them to strong impact.

(2) Do not remove modules' printed circuit boards from the enclosure in order to avoid changes in operation.

(3) Tighten the module mounting screws and terminal block screws within the tightening torque range specified below.

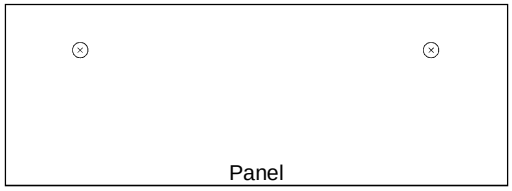
| Location of Screw | Tightening Torque Range |
|---|---|
| Module fixing screw (M3 × 12 screw) | 36 to 48 N・cm |
| I/O module terminal block screw (M3 screw) | 42 to 58 N・cm |
| I/O module terminal block fixing screw (M3 screw) | 66 to 89 N・cm |
| Power supply module terminal screw (M3.5 screw) | 59 to 88 N・cm |

(4) Be sure to install the power supply module in the Q3□B, Q6□B and QA1S6□B. Even if the power supply module is not installed, when the I/O modules and intelligent function module installed on the base units are of light load type, the modules may be operated. In this case, because a voltage becomes unstable, we cannot guarantee the operation.

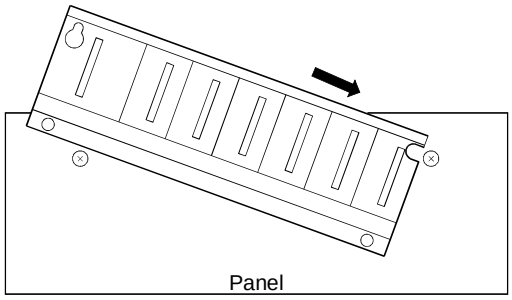
(5) When an extension cable is used, do not bind the cable together with the main circuit (high voltage, heavy current) line or lay them close to each other.

(6) Install the main base unit (by screwing) in the following procedure.

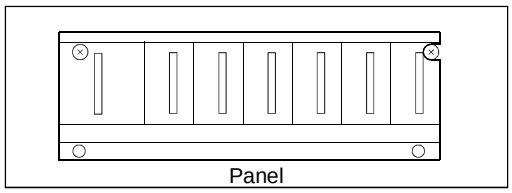
1) Fit the two base unit top fixing screws into the enclosure.




2) Place the right-hand side notch of the base unit onto the right-hand side screw.




3) Place the left-hand side pear-shaped hole onto the left-hand side screw.




4) Fit the fixing screws into the fixing screw holes in the base unit bottom and retighten the four fixing screws.

Note : Install the main base unit to a panel, with no module loaded in the rightmost slot.
Remove the base unit after unloading the module from the rightmost slot.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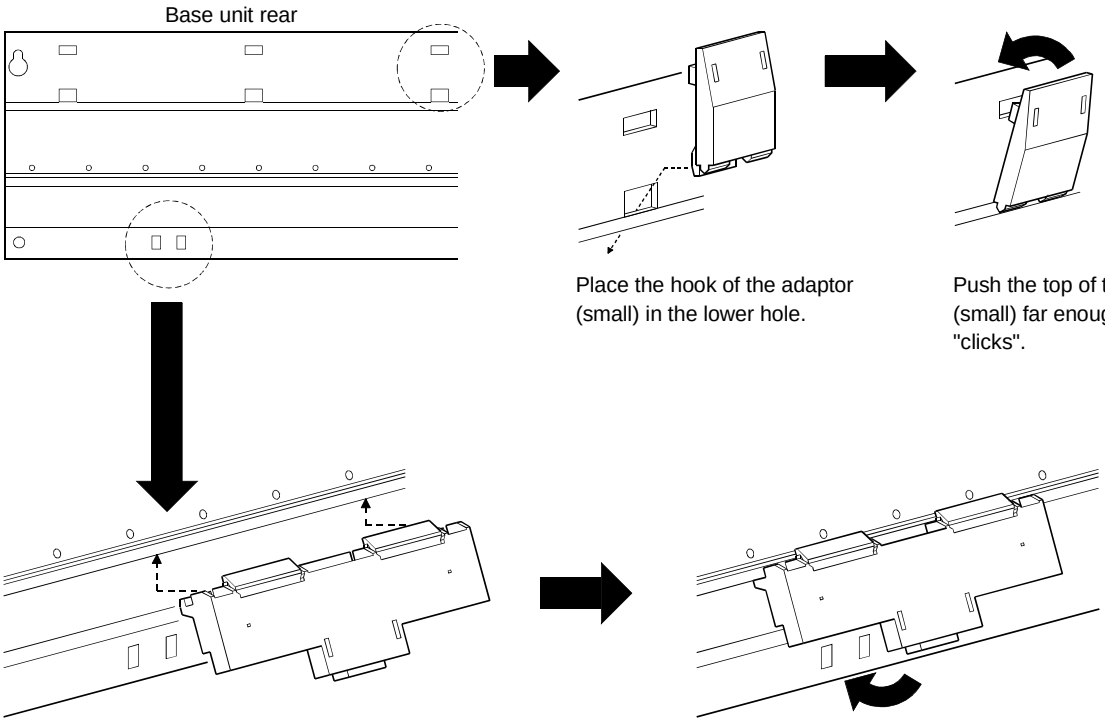
(7) Note the following points when mounting a DIN rail.
Mounting a DIN rail needs special adaptors (optional), which are to be user-prepared.

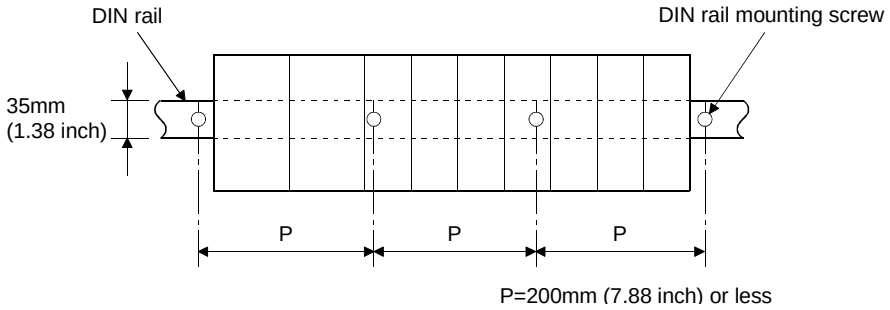
(a) Applicable adaptor types
For Q38B, Q312B, Q68B, Q612B : Q6DIN1
For Q35B, Q65B : Q6DIN2
For Q33B, Q52B, Q55B, Q63B : Q6DIN3

(b) Adaptor installation method
The way to install the adaptors for mounting a DIN rail to the base unit is given below.


Base unit rear
Place the hook of the adaptor (small) in the lower hole.
Push the top of the adaptor (small) far enough until it "clicks".
Insert the adaptor (large) into the grooves of the base unit from below.
Push the bottom of the adaptor (large) far enough until it "clicks".

(c) Applicable DIN rail types (JIS C 2812)
TH35-7.5Fe
TH35-7.5Al
TH35-15Fe

(d) DIN rail mounting screw intervals
When using a TH35-7.5Fe or TH35-7.5Al DIN rail, rail mounting screws should be tightened at a pitch of 200 mm (7.88 inch) or less in order to ensure that the rail has sufficient strength.

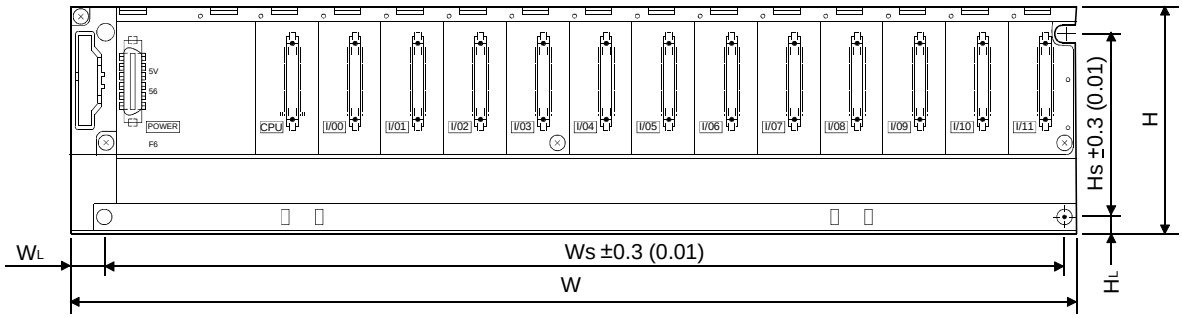


## 9.3.2 Instructions for mounting the base unit

When mounting the PLC to an enclosure or the like, fully consider its operability, maintainability and environmental resistance.

### (1) Mounting dimensions

Mounting dimensions of each base unit are as follows:

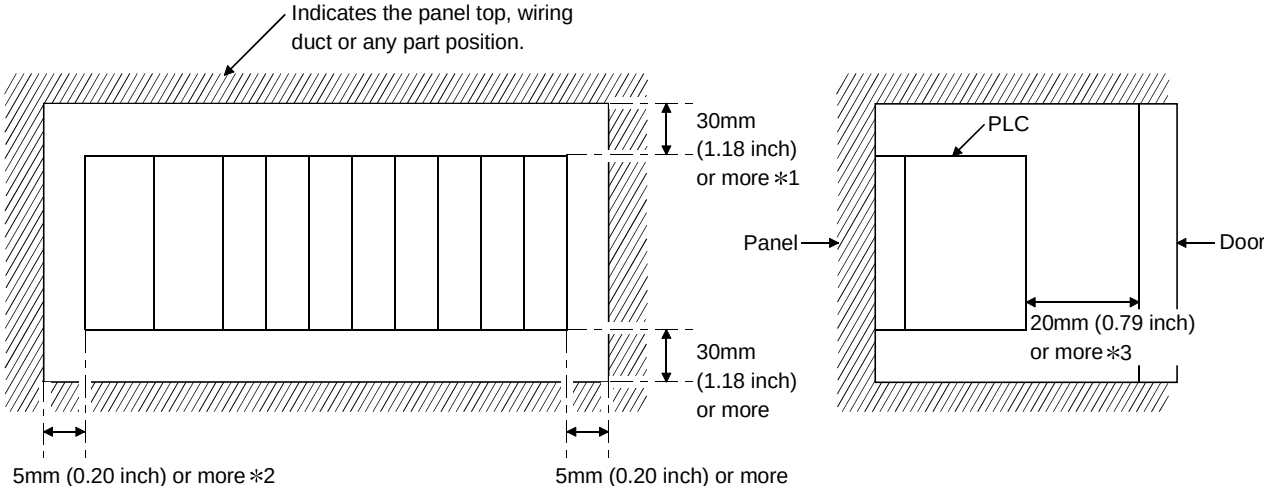



| | Q33B | Q35B | Q38B | Q312B | Q52B | Q55B | Q63B | Q65B | Q68B | Q612B |
|---|---|---|---|---|---|---|---|---|---|---|
| W | 189 (7.44) | 245 (9.65) | 328 (12.92) | 439 (17.30) | 106 (4.17) | 189 (7.44) | 189 (7.44) | 245 (9.65) | 328 (12.92) | 439 (17.30) |
| Ws | 169 (6.65) | 224.5 (8.85) | 308 (12.14) | 419 (16.51) | 83.5 (3.29) | 167 (6.57) | 167 (6.57) | 222.5 (8.77) | 306 (12.06) | 417 (16.43) |
| WL | 15.5 (0.61) | | | | | | | | | |
| H | 98 (3.86) | | | | | | | | | |
| Hs | 80 (3.15) | | | | | | | | | |
| HL | 7 (0.28) | | | | | | | | | |

Unit: mm (inch)

### (2) Module mounting position

For enhanced ventilation and ease of module replacement, leave the following clearances between the module top/bottom and structure/parts.


Indicates the panel top, wiring duct or any part position.
30mm (1.18 inch) or more ∗1
Panel
PLC
Door
20mm (0.79 inch) or more ∗3
30mm (1.18 inch) or more
5mm (0.20 inch) or more ∗2
5mm (0.20 inch) or more

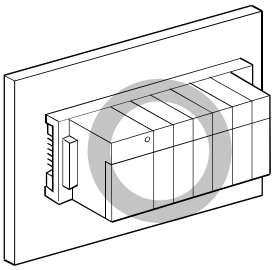
∗1 : For wiring duct (50mm (1.97 inch) or less height).
40mm (1.58 inch) or more for other cases.

∗2 : 5mm (0.20 inch) or more when the adjacent module is removed and the extension cable is connected.

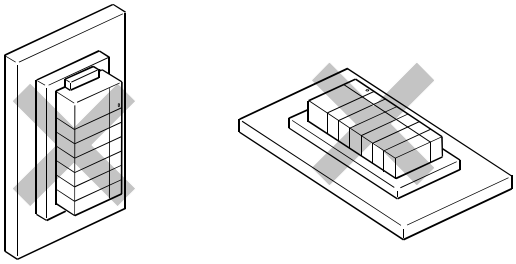
∗3 : 80mm (3.15 inch) or more for the connector type.

### (3) Module mounting orientation

(a) Since the PLC generates heat, it should be mounted on a well ventilated location in the orientation shown below.



(b) Do not mount it in either of the orientations shown below.



Vertical Flat

### (4) Installation surface

Mount the base unit on a flat surface. If the mounting surface is not even, this may strain the printed circuit boards and cause malfunctions.

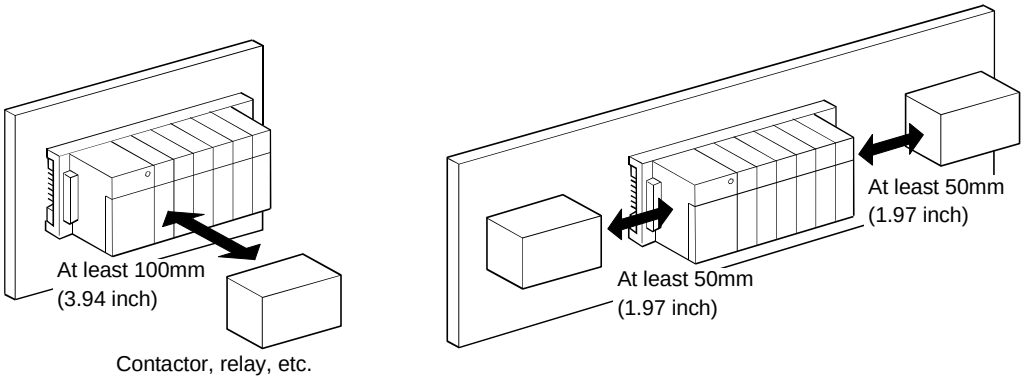
### (5) Installation of unit in an area where the other devices are installed

Avoid mounting base unit in proximity to vibration sources such as large magnetic contractors and no-fuse circuit breakers; mount these on a separate panel or at a distance.

### (6) Distances from the other devices

In order to avoid the effects of radiated noise and heat, provide the clearances indicated below between the PLC and devices that generate noise or heat (contactors and relays).

- Required clearance in front of PLC : at least 100 mm (3.94 inch)
- Required clearance on the right and left of PLC : at least 50 mm (1.97 inch)



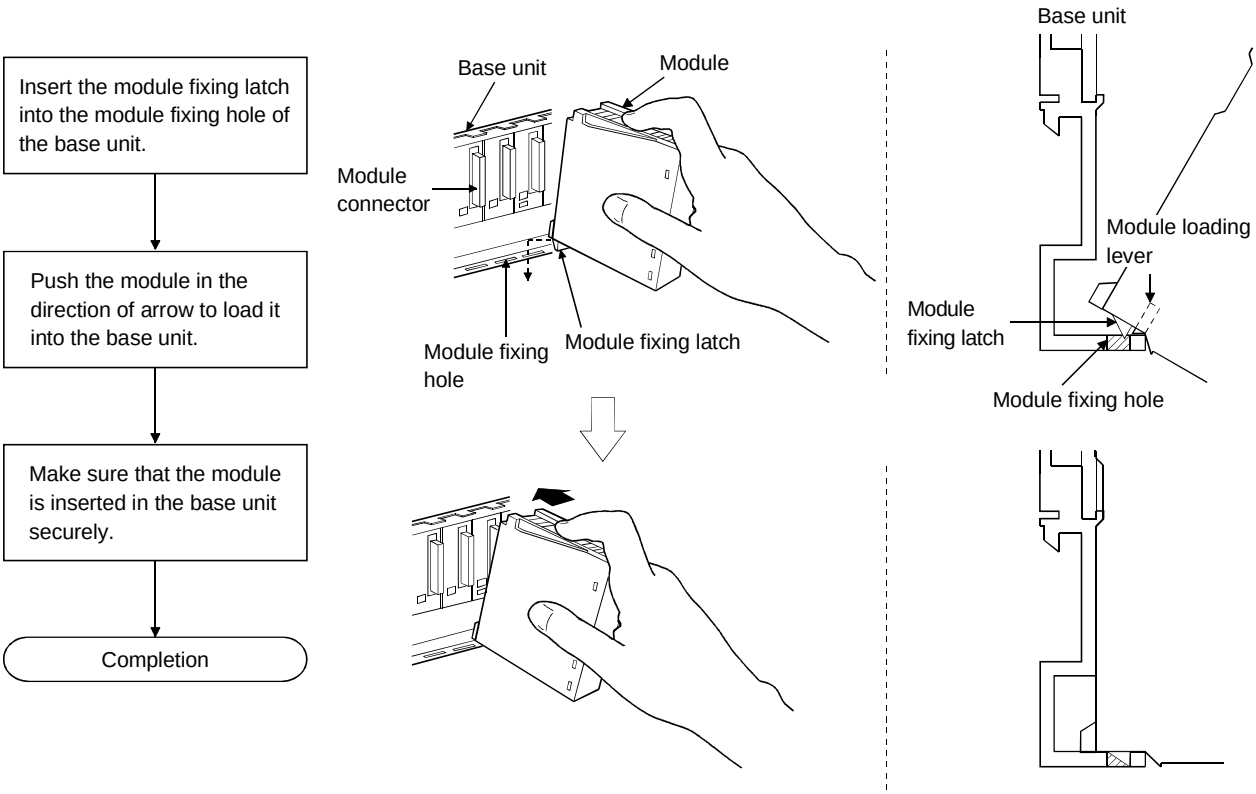
## 9.3.3 Installation and removal of module

This section explains how to install and remove a power supply, CPU, I/O, intelligent function or another module to and from the base unit.

### (1) Installation and removal of the module from Q3□B, ,Q5□B and Q6□B

The installation and removal of the module from Q3□B/Q6□B base unit are described below.

(a) Installation of module on Q3□B, Q5□B and Q6□B

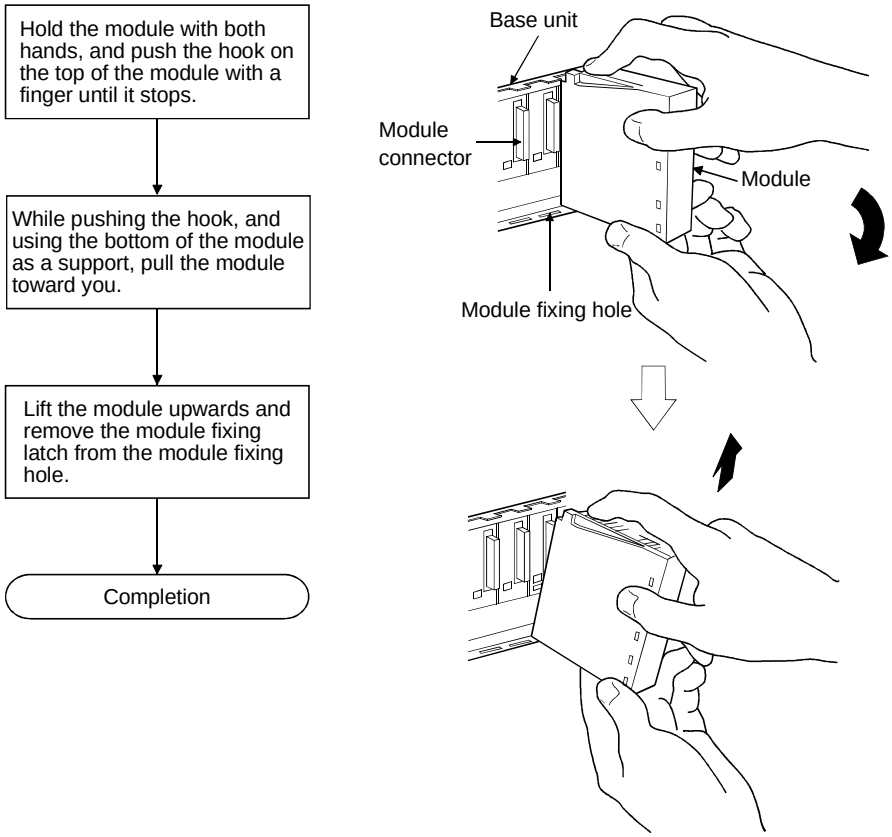

Insert the module fixing latch into the module fixing hole of the base unit.
Push the module in the direction of arrow to load it into the base unit.
Make sure that the module is inserted in the base unit securely.
Completion
Base unit
Module
Module connector
Module fixing hole
Module fixing latch
Base unit
Module loading lever
Module fixing latch
Module fixing hole

**POINTS**

(1) Always insert the module fixing latch of the module into the module fixing hole. Forcing the hook into the hole will damage the module connector and module.

(2) When using the PLC in a place where there is large vibration or impact, screw the CPU module to the base unit.
Module fixing screw : M3 × 12 (user-prepared)

(b) Removal from Q3□B, Q5□B and Q6□B


Hold the module with both hands, and push the hook on the top of the module with a finger until it stops.
While pushing the hook, and using the bottom of the module as a support, pull the module toward you.
Lift the module upwards and remove the module fixing latch from the module fixing hole.
Completion
Base unit
Module connector
Module
Module fixing hole

| POINT |
|---|
| When the module fixing screw is used, always remove the module by removing the module fixing screw and then taking the module fixing latch off the module fixing hole of the base unit.<br>Do not try to remove the module forcibly since this may damage the module. |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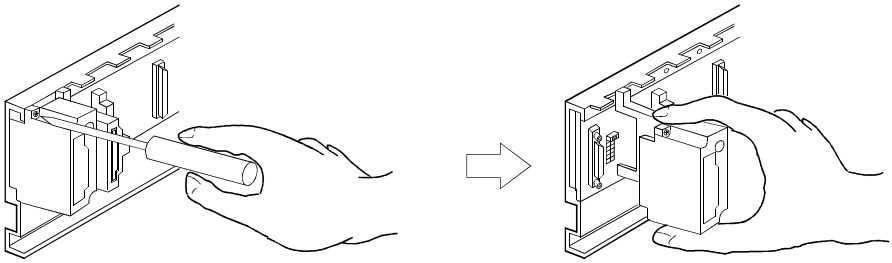
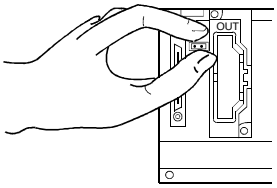
## 9.4 How to Set Stage Numbers for the Extension Base Unit

When using two or more extension base units, their stage numbers must be set with their stage number setting connectors. Extension 1 need not be set since the extension number is factory-set to 1.
Make this setting in the following procedure.

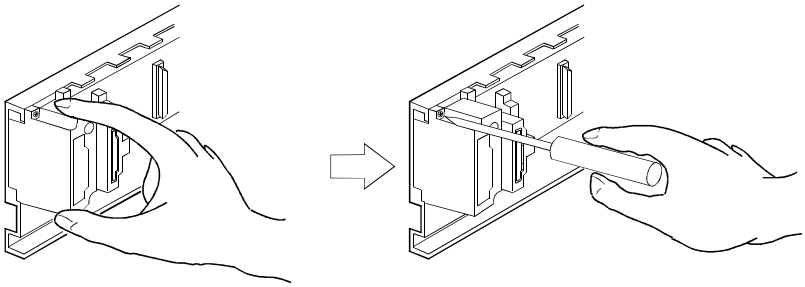
(1) The stage number setting connector of the extension base unit is located under the IN side base cover. (Refer to Section 6.4 for the setting of the extension number setting connector.)
First, loosen the upper and lower screws in the IN side base cover and remove the base cover from the extension base unit.



(2) Insert the connector pin in the required stage number location of the connector (PIN1) existing between the IN and OUT sides of the extension cable connector.




(3) Install the base cover to the extension base unit and tighten the base cover screw. (Tightening torque: 36 to 48N • cm)

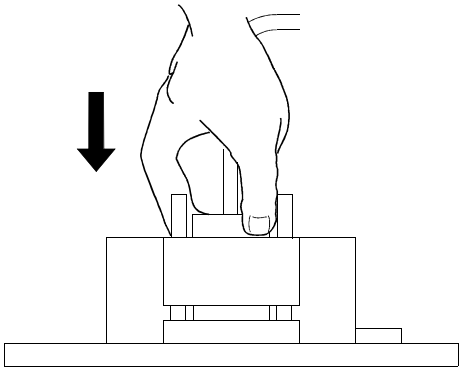



9 - 16

## 9.5 Connection and Disconnection of Extension Cable

### (1) Instructions for handling an extension cable

- Do not stamp an extension cable.
- An extension cable must be connected to the base unit when the base cover has been installed.
  (After you have set the extension number to the extension base unit, reinstall and screw the base cover.)
- When running an extension cable, the minimum bending radius of the cable should be 55mm (2.17 inch) or more.
  If it is less than 55mm (2.17 inch), a malfunction may occur due to characteristic deterioration, open cable or the like.
- When connecting or disconnecting an extension cable, do not hold the ferrite cores mounted at both ends of the cable.
  Hold the connector part of the cable for connection or disconnection.



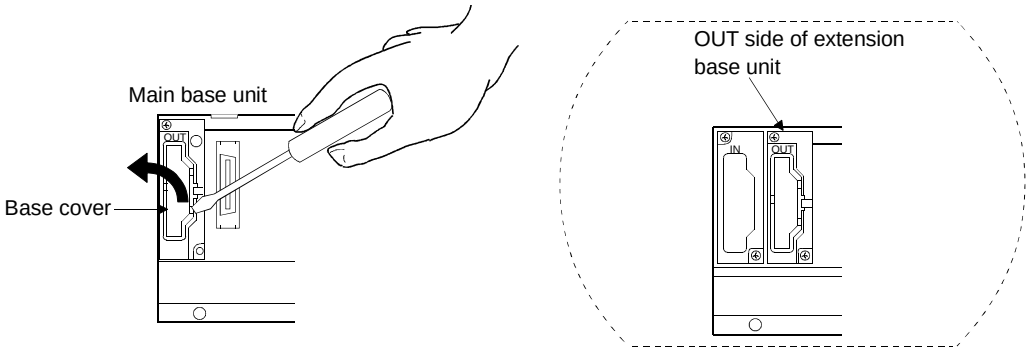
Holding the ferrite core may cause the cable to open within the connector.
Also, if the ferrite core is shifted, the characteristic will change. When handling the cable, take care not to shift the ferrite core positions.

### (2) Connection of extension cable

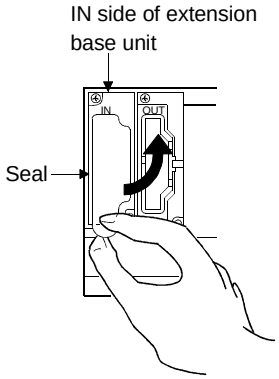
**POINT**

When connecting an extension base unit to the main base unit with an extension cable, always plug the OUT side connector of the main base unit and the IN side connector of the extension base unit with an extension cable. The system will not operate properly if the extension cable is connected in the form of IN to IN, OUT to OUT or IN to OUT.
When connecting two or more extension base units, plug the OUT side connector of the first extension base unit and the IN side connector of the second extension base unit with an extension cable.

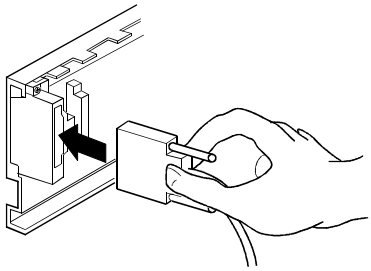
(a) To connect an extension cable to the main base unit, remove the portion under the OUT characters on the base cover with a tool such as a flat-blade screwdriver (5.5 × 75, 6 × 100).
This also applies to a case where an extension cable is connected to the OUT side connector of the extension base unit.



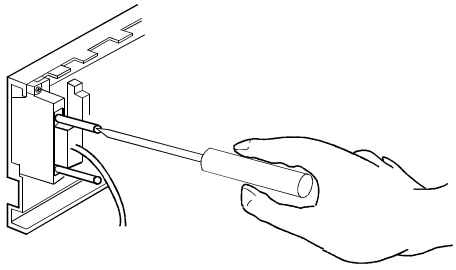

(b) To connect the extension cable to the next extension base unit, remove the seal applied under the IN characters on the base cover.




(c) When plugging the extension cable to any base unit, hold the connector part of the extension cable.



(d) After fitting the extension cable, always tighten the extension cable connector fixing screws.
(Tightening torque: 20N • cm)




9 - 18

### (3) Disconnection of extension cable

When unplugging the extension cable, hold and pull the connector part of the extension cable after making sure that the fixing screws have been removed completely.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## 9.6 Wiring

### 9.6.1 The precautions on the wiring

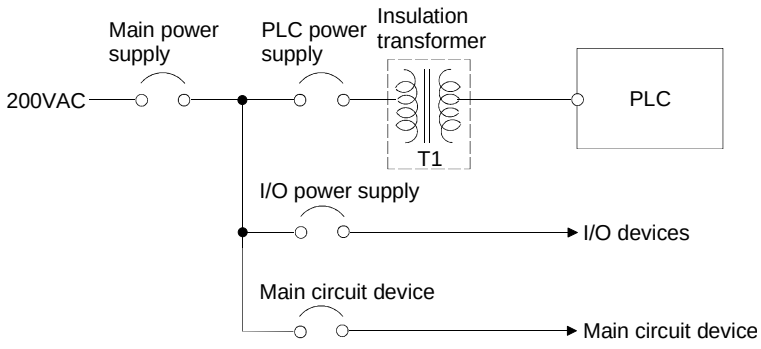
| | |
|---|---|
| ⚠ DANGER | ● Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.<br>● When turning on the power supply or operating the module after installation or wiring work, be sure that the module's terminal covers are correctly attached. Not attaching the terminal cover could result in electric shock. |

| | |
|---|---|
| ⚠ CAUTION | ● Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.<br>● When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.<br>● External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires, or erroneous operation.<br>● Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.<br>● Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.<br>● The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.<br>Do not peel this label during wiring.<br>Before starting system operation, be sure to peel this label because of heat dissipation. |

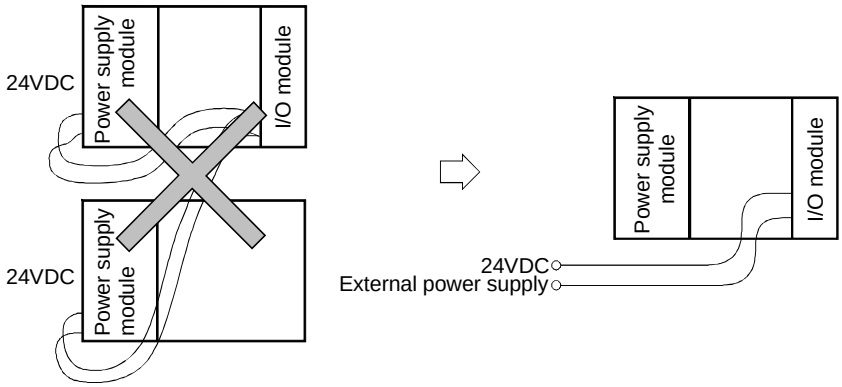
The precautions on the connection of the power cables are described below.

(1) Power supply wiring

(a) Separate the PLC's power supply line from the lines for I/O devices and power devices as shown below.
When there is much noise, connect an insulation transformer.



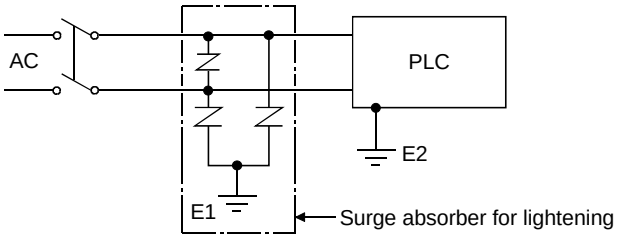
(b) Do not connect the 24VDC outputs of two or more power supply modules in parallel to supply power to one I/O module. Parallel connection will damage the power supply modules.




(c) 100VAC, 200VAC and 24VDC wires should be twisted as dense as possible. Connect the modules with the shortest distance.
Also, to reduce the voltage drop to the minimum, use the thickest wires possible (maximum 2mm$^2$).

(d) Do not bundle the 100VAC and 24VDC wires with, or run them close to, the main circuit (high voltage, large current) and I/O signal lines. If possible, run them more than 100mm (3.94 inch) away.

(e) As a countermeasure to power surge due to lightening, connect a surge absorber for lightening as shown below.




**POINT**

(1) Separate the ground of the surge absorber for lightening (E1) from that of the PLC (E2).
(2) Select a surge absorber for lightening whose power supply voltage does no exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

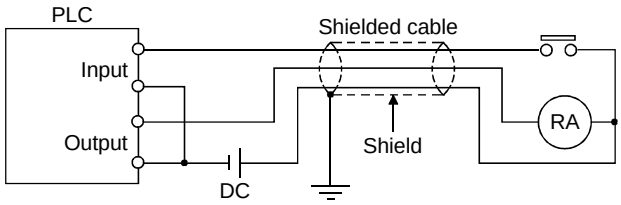
## (2) Wiring of I/O equipment

(a) Insulation-sleeved crimping terminals cannot be used with the terminal block. It is recommended to cover the wire connections of the crimping terminals with mark or insulation tubes.

(b) The wires used for connection to the terminal block should be 0.3 to 0.75mm$^2$ in core and 2.8mm (0.11 inch) max. in outside diameter.

(c) Run the input and output lines away from each other.

(d) When the wiring cannot be run away from the main circuit and power lines, use a batch-shielded cable and ground it on the PLC side.
In some cases, ground it in the opposite side.




(e) Where wiring runs through piping, ground the piping without fail.

(f) Run the 24VDC input line away from the 100VAC and 200VAC lines.

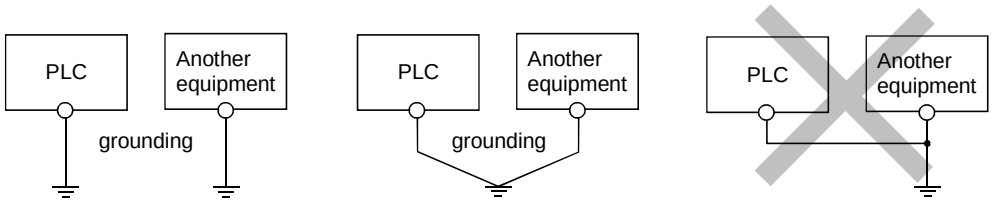
(g) Wiring of 200m (686.67 ft.) or longer distance will give rise to leakage currents due to the line capacity, resulting in a fault.
Refer to Section 11.5 for details.

## (3) Grounding

To ground the cable, follow the steps (a) to (c) shown below.

(a) Use the dedicated grounding as far as possible.

(b) When a dedicated grounding cannot be performed, use (2) Common Grounding shown below.

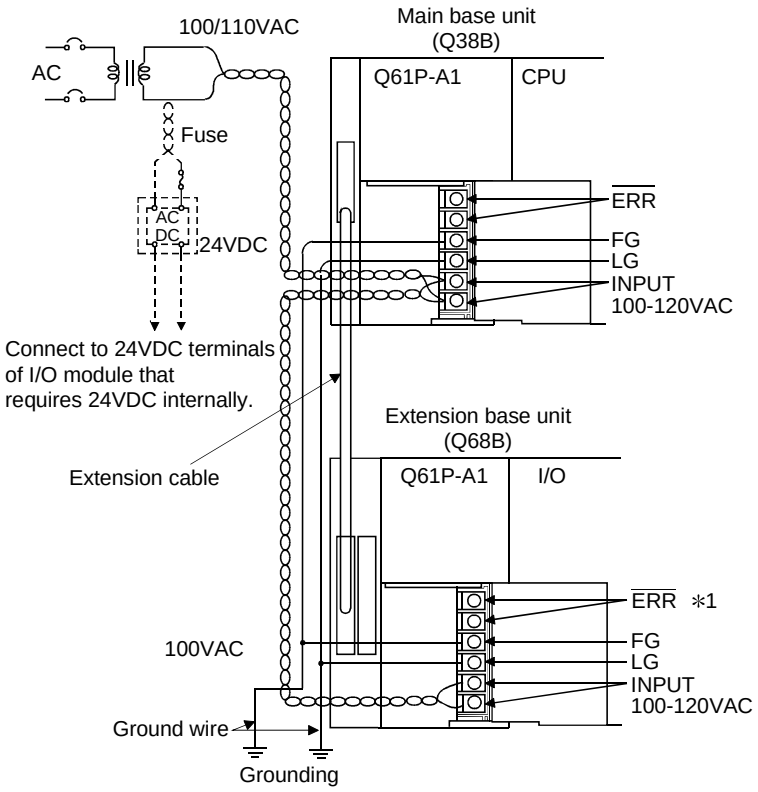



(1) Independent grounding.....Best (2) Common grounding.....Good (3) Joint grounding.....Not allowed

(c) For grounding a cable, use the cable of 2 mm$^2$ or more.
Position the ground-contact point as closely to the sequencer as possible, and reduce the length of the grounding cable as much as possible.

## 9.6.2 Connecting to the power supply module

The following diagram shows the wiring example of power lines, grounding lines, etc. to the main and extension base units.




**POINTS**

(1) Use the thickest possible (max. 2 $mm^2$ (14 AWG)) wires for the 100/200 VAC and 24 VDC power cables. Be sure to twist these wires starting at the connection terminals. To prevent a short-circuit should any screws loosen, use solderless terminals with insulation sleeves.

(2) When the LG terminals and FG terminals are connected, be sure to ground the wires. Do not connect the LG terminals and FG terminals to anything other than ground. If LG terminals and FG terminals are connected without grounding the wires, the PLC may be susceptible to noise. In addition, since the LG terminals have potential, the operator may receive an electric shock when touching metal parts.

(3) *1 An error cannot be output from the $\overline{\text{ERR}}$ terminal of the power supply module loaded on the extension base. To output an error, use the $\overline{\text{ERR}}$ terminal of the power supply module loaded on the main base.

# 10. MAINTENANCE AND INSPECTION

**DANGER**

- Do not touch the terminals while power is on.
  Doing so could cause shock.
- Correctly connect the battery. Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery.
  Mishandling of a battery can cause overheating or cracks which could result in injury and fires.
- Turn the power off when cleaning the module or tightening the terminal screws or module mounting screws.
  Conducting these operations when the power is on could result in electric shock.
  Loose terminal screws may cause short circuits or malfunctions.
  Failure to mount the module properly will result in short circuit, malfunction or in the module falling.

**CAUTION**

- In order to ensure safe operation, read the manual carefully to acquaint yourself with procedures for program change, forced outputs, RUN, STOP, and PAUSE operations, etc., while operation is in progress.
  Operation mistakes could cause damage to the equipment and other problems.
- Never try to disassemble of modify module. It may cause product failure, malfunction, fire or cause injury.
- When using any radio communication device such as a cellular phone or a PHS phone, keep them away from the controller at least 25 cm (9.85 inch) or it may cause a malfunction.
- Turn the power off when installing or removing the modules.
  Trying to install or remove the module while the power is on could damage the module or result in erroneous operation.

In order that you can use the PLC in normal and optimal condition at all times, this section describes those items that must be maintained or inspected daily or at regular intervals.


10 - 1

## 10.1 Daily Inspection

The items that must be inspected daily are listed below.

Daily inspection

| Item | Inspection Item | | Inspection | Judgment Criteria | Remedy |
|---|---|---|---|---|---|
| 1 | Installation of base unit | | Check that fixing screws are not loose and the cover is not dislocated. | The screws and cover must be installed securely. | Further tighten the screws. |
| 2 | Installation of I/O module | | Check that the module is not dislocated and the hook is engaged securely. | The hook must be engaged and installed securely. | Securely engaged the hook. |
| 3 | Connecting conditions | | Check for loose terminal screws. | Screws should not be loose. | Retighten terminal screws |
| | | | Proximity of solderless terminals to each other | The proper clearance should be provided between Solderless terminals | Correct. |
| | | | Connectors of extension cable | Connections should no be loose. | Retighten connector mounting screws. |
| 4 | Module indication LED | Power supply "POWER" LED | Check that the LED is ON. | The LED must be ON. (Abnormal if the LED is OFF.) | Follow Section 10.2. |
| | | CPU "RUN" LED | Check that the LED is ON in RUN status. | The LED must be ON. (Abnormal if the LED is OFF.) | |
| | | CPU "ERR." LED | Check that the LED is OFF. | The LED must be OFF. (Abnormal if the LED is ON or flickering.) | |
| | | CPU "BAT." LED | Check that the LED is OFF. | The LED must be OFF. (Abnormal if the LED is ON.) | |
| | | Input LED | Check that the LED turns ON and OFF. | The LED must be ON when the input power is turned ON.<br>The LED must be extinguished when the input power is turned OFF.<br>(Abnormal if the LED does not turn ON or turn OFF as indicated above.) | |
| | | Output LED | Check that the LED turns ON and OFF. | The LED turns ON when the output power is turned ON.<br>The LED must be extinguished when the output power is turned OFF.<br>(Abnormal if the LED does not turn ON or turn OFF as indicated above.) | |




10 - 2

## 10.2 Periodic Inspection

The items that must be inspected one or two times every 6 months to 1 year are listed below.
When the equipment is moved or modified, or layout of the wiring is changed, also perform this inspection.

Periodic Inspection

| Item | Inspection Item | | Inspection | Judgment Criteria | Remedy |
|---|---|---|---|---|---|
| 1 | Ambient environment | Ambient temperature | Measure with a thermometer and a hygrometer. Measure corrosive gas. | 0 to 55 °C | When the sequencer is used in the board, the ambient temperature in the board becomes the ambient temperature. |
| | | Ambient humidity | | 5 to 95 %RH ✻1 | |
| | | Atmosphere | | Corrosive gas must not be present. | |
| 2 | Power voltage | | Measure a voltage across the terminals of 100/200VAC and 24VDC. | 85 to 132VAC<br>170 to 264VAC<br>15.6 to 31.2VDC | Change the power supply. |
| 3 | Installation | Looseness, rattling | Move the module to check for looseness and rattling. | The module must be installed fixedly. | Further tighten screws. If the CPU, I/O, or power supply module is loose, fix it with screws. |
| | | Adhesion of dirt and foreign matter | Check visually. | Dirt and foreign matter must not be present. | Remove and clean. |
| 4 | Connection | Looseness of terminal screws | Try to further tighten screws with a screwdriver. | Screws must not be loose. | Further tighten. |
| | | Proximity of solderless terminals to each other | Check visually. | Solderless terminals must be positioned at proper intervals. | Correct. |
| | | Looseness of connectors | Check visually. | Connectors must not be loose. | Further tighten connector fixing screws. |
| 5 | Battery | | check on the monitor mode of the GX Developer that SM51 or SM52 is turned OFF. | (Preventive maintenance) | Even if the lowering of a battery capacity is not shown, replace the battery with a new one if a specified service life of the battery is exceeded. |

## 10.3 Battery Replacement

When the voltage of the program and power interrupt hold-on function backup battery is lowered, the special relays SM51 and SM52 are energized.
Even if these special relays are energized, the contents of the program and power interrupt hold-on function are not erased immediately.
If the energization of these relays is recognized, however, these contents may be deleted unintentionally.
While a total of the power interrupt hold-on time after the SM51 is energized is within a specified time, replace the battery with a new one.

**POINTS**

The SM51 is used to give an alarm when the capacity of the battery is lowered.
Even after it is energized, the data is held for a specified time.
For safety, however, replace the battery with a new one as early as possible.
The SM52 is energized when the battery causes a complete discharge error.
Immediately after the relay has been energized, replace the battery with a new one.

Whichever voltage of the battery of the CPU module and SRAM card is lowered, the SM51 and SM52 are energized.
To identify the specific battery of the memory of which voltage is lowered, check the contents of the special resisters SD51 and SD52.
When the voltage of the battery of each memory is lowered, the bit corresponding to each of SD51 and SD52 memories is turned on.

| Bit No. of SD51 and SD52 | Object |
|---|---|
| Bit 0 | CPU module |
| Bit 1,2 | SRAM card |

**POINTS**

The relation between the backups of the memories preformed by the batteries which are installed on the CPU module and SRAM card is described below.
The items that must be considered are the following two points.
1) The battery installed on the CPU module cannot backup the memory of the SRAM card.
2) The battery installed on the SRAM card cannot backup the memory of the CPU module.

| Power supply Module | Battery of CPU Module | Battery of SRAM Card | Memory of CPU Module | Memory of SRAM Card |
|---|---|---|---|---|
| ON | Connection | ON | ○ | ○ |
| | | OFF | ○ | ○ |
| | Unconnection | ON | ○ | ○ |
| | | OFF | ○ | ○ |
| OFF | Connection | ON | ○ | ○ |
| | | OFF | ○ | × |
| | Unconnection | ON | × | ○ |
| | | OFF | × | × |

○ : Backup enable ×: Backup unable

The standard service life and replacement procedures of the battery is described on the next page.

## 10.3.1 Battery life

### (1) CPU module battery (Q6BAT) life

(a) The CPU module battery life is given below.

| CPU Module Type | Energization Time Ratio ∗1 | Battery life | | |
|---|---|---|---|---|
| | | Guaranteed value (MIN) | Value in actual use (TYP) | After SM51 is energized (Guaranteed time after alarm occurrence) |
| Q12PHCPU Q25PHCPU | 0% | 1260hr | 4228hr | 48hr |
| | 30% | 1800hr | 6040hr | 48hr |
| | 50% | 2520hr | 8456hr | 48hr |
| | 70% | 4200hr | 14093hr | 48hr |
| | 100% | 10years | 10years | 48hr |

∗1: The energization time ratio denotes the ratio of power-on time in a day (24 hours). (When power is on for 12 hours and off for 12 hours, the energization time ratio is 50%.)

(b) The Q6BAT life is 10 years when it is used without connecting to the CPU module.

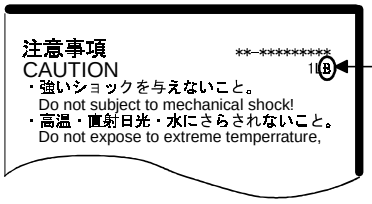
### (2) SRAM card battery life

The SRAM card battery life is indicated below.

| SRAM card | Energization Time Ratio ∗1 | Battery life | | |
|---|---|---|---|---|
| | | Guaranteed value (MIN) | Value in actual use (TYP) | After SM51 is energized (Guaranteed time after alarm occurrence) |
| Q2MEM-2MBS | 0% | 2400hr | 2.7years | 20hr |
| | 30% | 2880hr | 3.6years | 20hr |
| | 50% | 4320hr | 4.5years | 20hr |
| | 70% | 6480hr | 5.0years | 20hr |
| | 100% | 5.0years | 5.0years | 50hr |
| Q2MEM-1MBS Manufacturing control number "□□B" ∗2 | 0% | 2400hr | 2.7years | 20hr |
| | 30% | 2880hr | 3.6years | 20hr |
| | 50% | 4320hr | 4.5years | 20hr |
| | 70% | 6480hr | 5.0years | 20hr |
| | 100% | 5.0years | 5.0years | 50hr |
| Q2MEM-1MBS Manufacturing control number "□□A" ∗2 | 0% | 690hr | 6336hr | 8hr |
| | 100% | 11784hr | 13872hr | 8hr |

∗1: The energization time ratio denotes the ratio of power-on time in a day (24 hours) . (When power is on for 12 hours and off for 12 hours, the energization time ratio is 50%.)

∗2: The manufacturing control number is given on the SRAM card rear label (see below).



| POINT |
| --- |
| Remember that the SRAM card consumes battery power even when the battery is connected to the CPU module and the power is turned ON. |

If the special relay SM51 (battery low latch) turns on, immediately replace the battery. If an alarm has not yet occurred, it is recommended to replace the battery periodically according to the conditions of use.

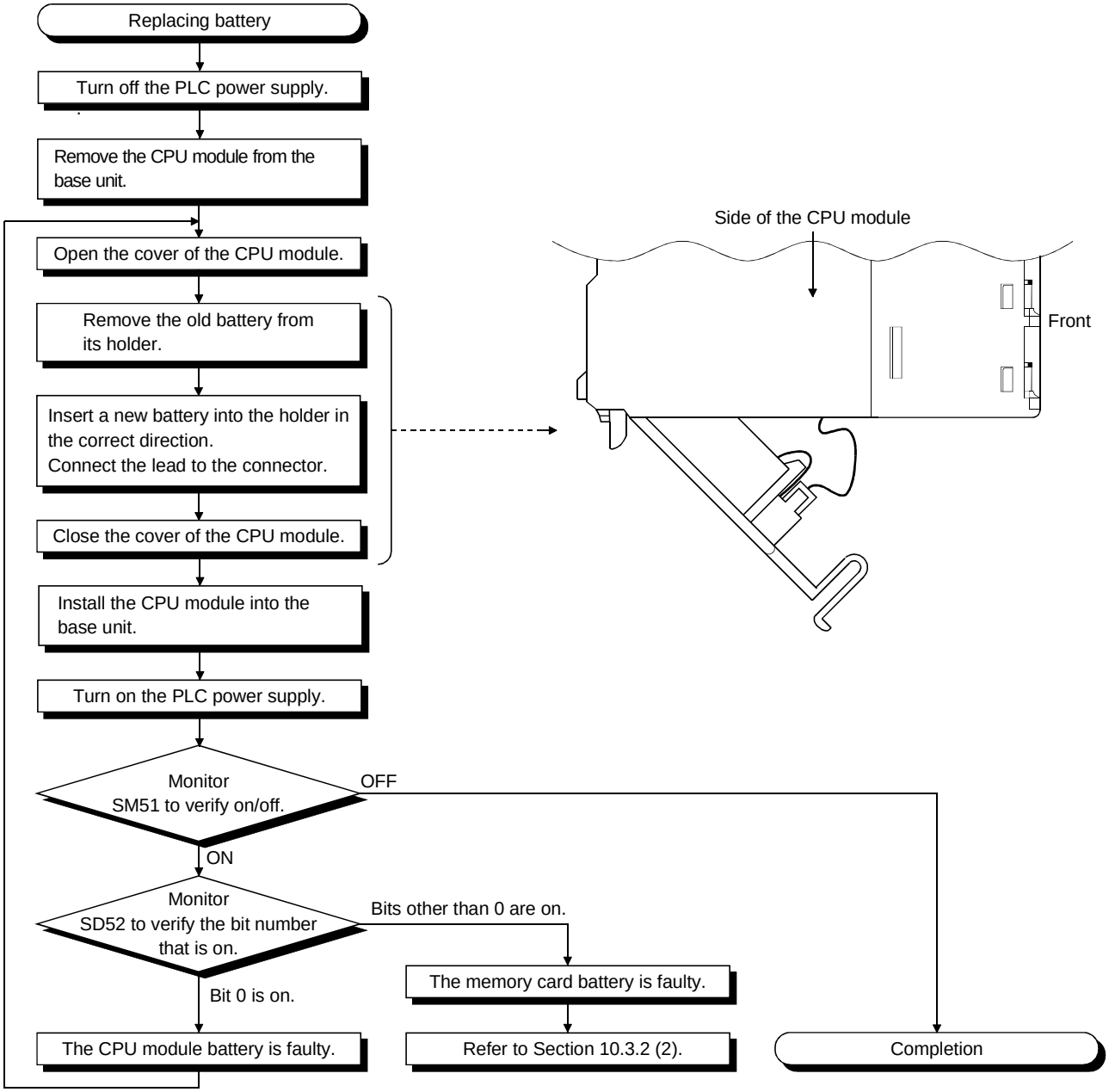
## 10.3.2 Battery replacement procedure

### (1) CPU module battery replacement procedure

When the CPU module battery has been exhausted, replace the battery with a new one according to the procedure shown below. The PLC power must be on for 10 minutes or longer before dismounting the battery.
Even when the battery is dismounted, the memories are backed up by the capacitor for a while. However, if the replacement time exceeds the guaranteed value specified in the table below, the contents stored in the memories may be erased. To prevent this trouble, replace the battery speedily.

Backup time by capacitor

| Backup time by capacitor[min] |
|---|
| 3 |


Replacing battery
Turn off the PLC power supply.
Remove the CPU module from the base unit.
Open the cover of the CPU module.
Remove the old battery from its holder.
Insert a new battery into the holder in the correct direction.
Connect the lead to the connector.
Close the cover of the CPU module.
Install the CPU module into the base unit.
Turn on the PLC power supply.
Monitor SM51 to verify on/off.
OFF
ON
Monitor SD52 to verify the bit number that is on.
Bits other than 0 are on.
Bit 0 is on.
The memory card battery is faulty.
The CPU module battery is faulty.
Refer to Section 10.3.2 (2).
Completion
Side of the CPU module
Front

### (2) SRAM card CPU module battery replacement procedure

Replace the SRAM card battery in the following procedure.

**POINTS**

Replace the battery while paying attention to the following.

(a) To back up the data, replace the SRAM card battery with the PLC power supply ON and the SRAM card installed.

(b) Start replacement after backing up the CPU module data using GX Developer.

(c) Since replacement is made with the PLC power supply ON, take extreme care not to get an electric shock.

(d) When dismounting or mounting the battery holder on the SRAM card, take care so that the battery does not come out of the battery holder.

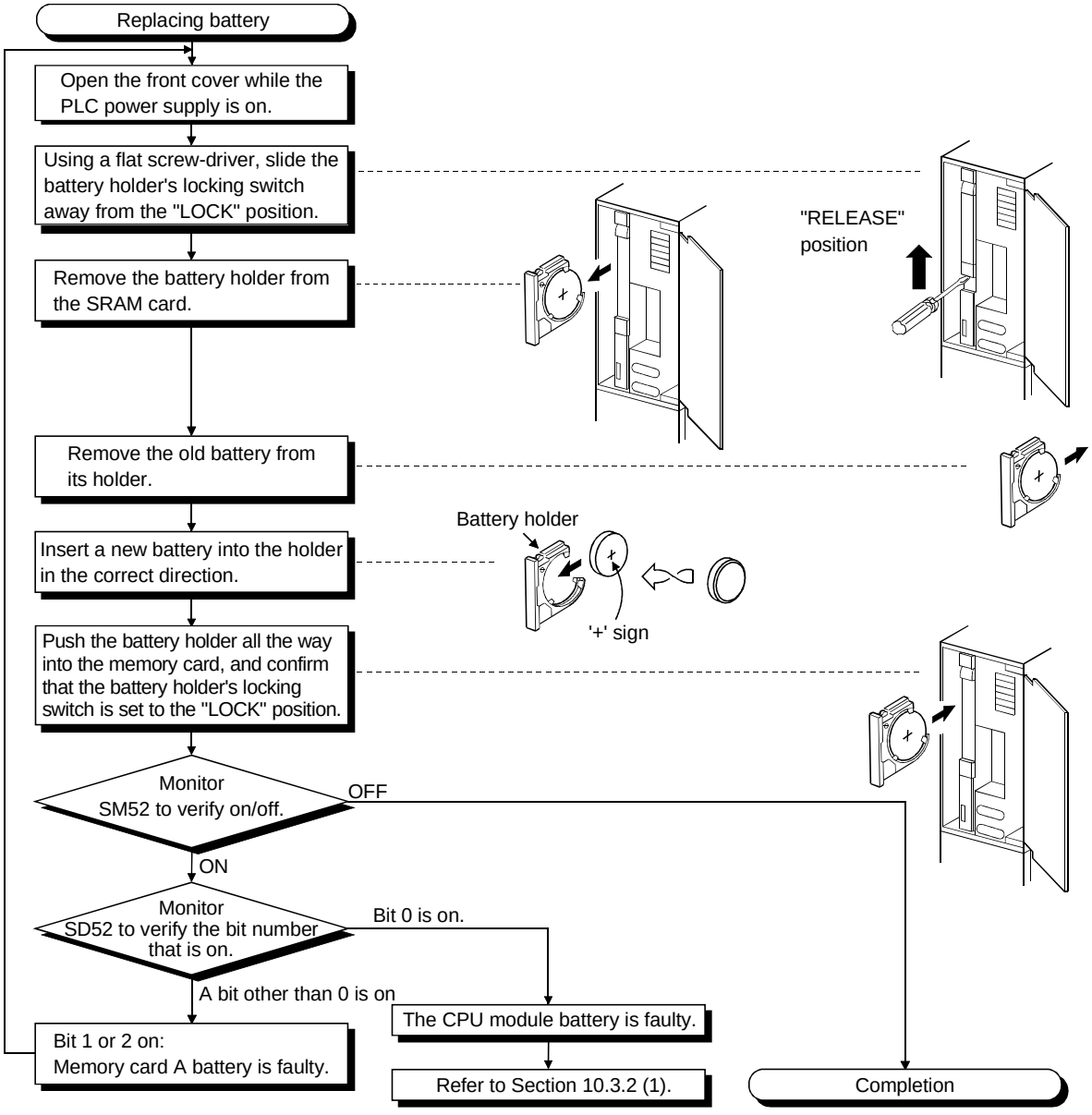
(e) When replacing the battery with the PLC power supply OFF, always back up the data before starting replacement.

[Battery replacement procedure]

1) Back up the SRAM card data using GX Developer.

2) Replace the battery.

3) Write the backed up data from GX Developer to the memory card.


Replacing battery
Open the front cover while the PLC power supply is on.
Using a flat screw-driver, slide the battery holder's locking switch away from the "LOCK" position.
Remove the battery holder from the SRAM card.
Remove the old battery from its holder.
Insert a new battery into the holder in the correct direction.
Push the battery holder all the way into the memory card, and confirm that the battery holder's locking switch is set to the "LOCK" position.
Monitor SM52 to verify on/off.
OFF
ON
Monitor SD52 to verify the bit number that is on.
Bit 0 is on.
A bit other than 0 is on
Bit 1 or 2 on: Memory card A battery is faulty.
The CPU module battery is faulty.
Refer to Section 10.3.2 (1).
Completion
"RELEASE" position
Battery holder
'+' sign

# 11. TROUBLESHOOTING



This section describes the various types of trouble that occur when the system is operated, and causes and remedies of these troubles.

## 11.1 Troubleshooting Basics

In order to increase the reliability of the system, not only highly reliable devices are used but also the speedy startup of the system after the occurrence of trouble becomes an important factor.
To start up the system speedily, the cause of the trouble must be located and eliminated correctly.
The basic three points that must be followed in the troubleshooting are as follows.

### (1) Visual inspection

Visually check the following.

1) Movement of sequencer (stopped condition, operating condition)
2) Power supply on/off
3) Status of input/output devices
4) Power supply module, CPU module, I/O module, intelligent function module, installation condition of extension cable
5) Status of wiring (I/O cables, cables)
6) Display status of various types of indicators ("POWER" LED, "RUN" LED, "ERR." LED, I/O LED)
7) Status of setting of various types of set switches (Setting of No. of stages of extension base, power interrupt hold-on status)

After confirming items 1) to 7), connect the GX Developer, and check the operating conditions of the PLC and the contents of the program.

### (2) Check of trouble

Check to see how the operating condition of the PLC varies while the PLC is operated as follows.

1) Set the RUN/STOP switch to STOP.
2) Reset the trouble with the RESET/L.CLR switch.
3) Turn ON and OFF the power supply.

### (3) Reduction in area

Estimate the troubled part in accordance with items (1) and (2) above.

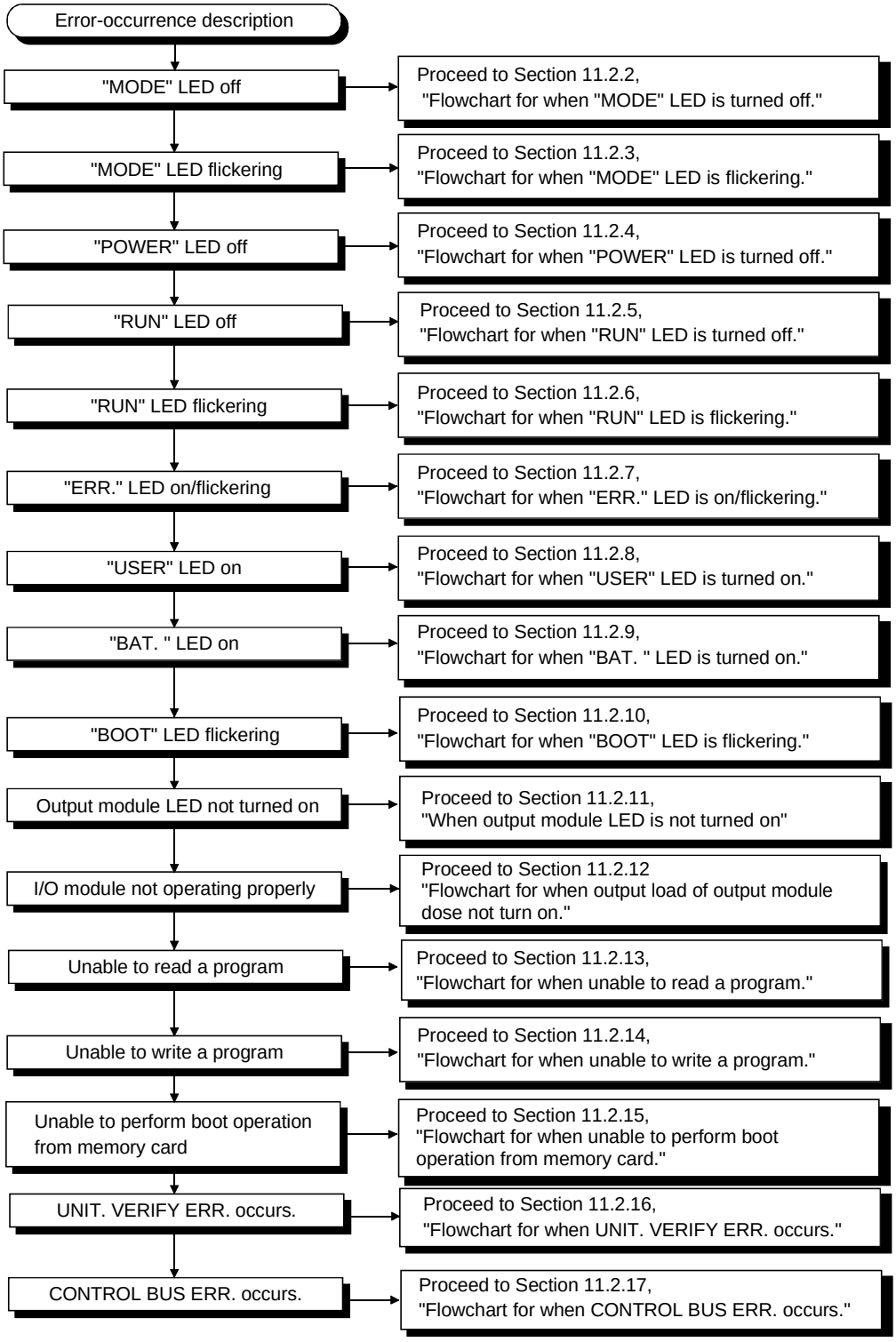
1) PLC or external devices
2) I/O module or others
3) Sequence program

## 11.2 Troubleshooting

The trouble investigating methods, contents of troubles for the error codes, and remedies of the troubles are described below.

### 11.2.1 Troubleshooting flowchart

The following shows the contents of the troubles classified into a variety of groups according to the types of events.


Error-occurrence description
"MODE" LED off
Proceed to Section 11.2.2, "Flowchart for when "MODE" LED is turned off."
"MODE" LED flickering
Proceed to Section 11.2.3, "Flowchart for when "MODE" LED is flickering."
"POWER" LED off
Proceed to Section 11.2.4, "Flowchart for when "POWER" LED is turned off."
"RUN" LED off
Proceed to Section 11.2.5, "Flowchart for when "RUN" LED is turned off."
"RUN" LED flickering
Proceed to Section 11.2.6, "Flowchart for when "RUN" LED is flickering."
"ERR." LED on/flickering
Proceed to Section 11.2.7, "Flowchart for when "ERR." LED is on/flickering."
"USER" LED on
Proceed to Section 11.2.8, "Flowchart for when "USER" LED is turned on."
"BAT. " LED on
Proceed to Section 11.2.9, "Flowchart for when "BAT. " LED is turned on."
"BOOT" LED flickering
Proceed to Section 11.2.10, "Flowchart for when "BOOT" LED is flickering."
Output module LED not turned on
Proceed to Section 11.2.11, "When output module LED is not turned on"
I/O module not operating properly
Proceed to Section 11.2.12 "Flowchart for when output load of output module dose not turn on."
Unable to read a program
Proceed to Section 11.2.13, "Flowchart for when unable to read a program."
Unable to write a program
Proceed to Section 11.2.14, "Flowchart for when unable to write a program."
Unable to perform boot operation from memory card
Proceed to Section 11.2.15, "Flowchart for when unable to perform boot operation from memory card."
UNIT. VERIFY ERR. occurs.
Proceed to Section 11.2.16, "Flowchart for when UNIT. VERIFY ERR. occurs."
CONTROL BUS ERR. occurs.
Proceed to Section 11.2.17, "Flowchart for when CONTROL BUS ERR. occurs."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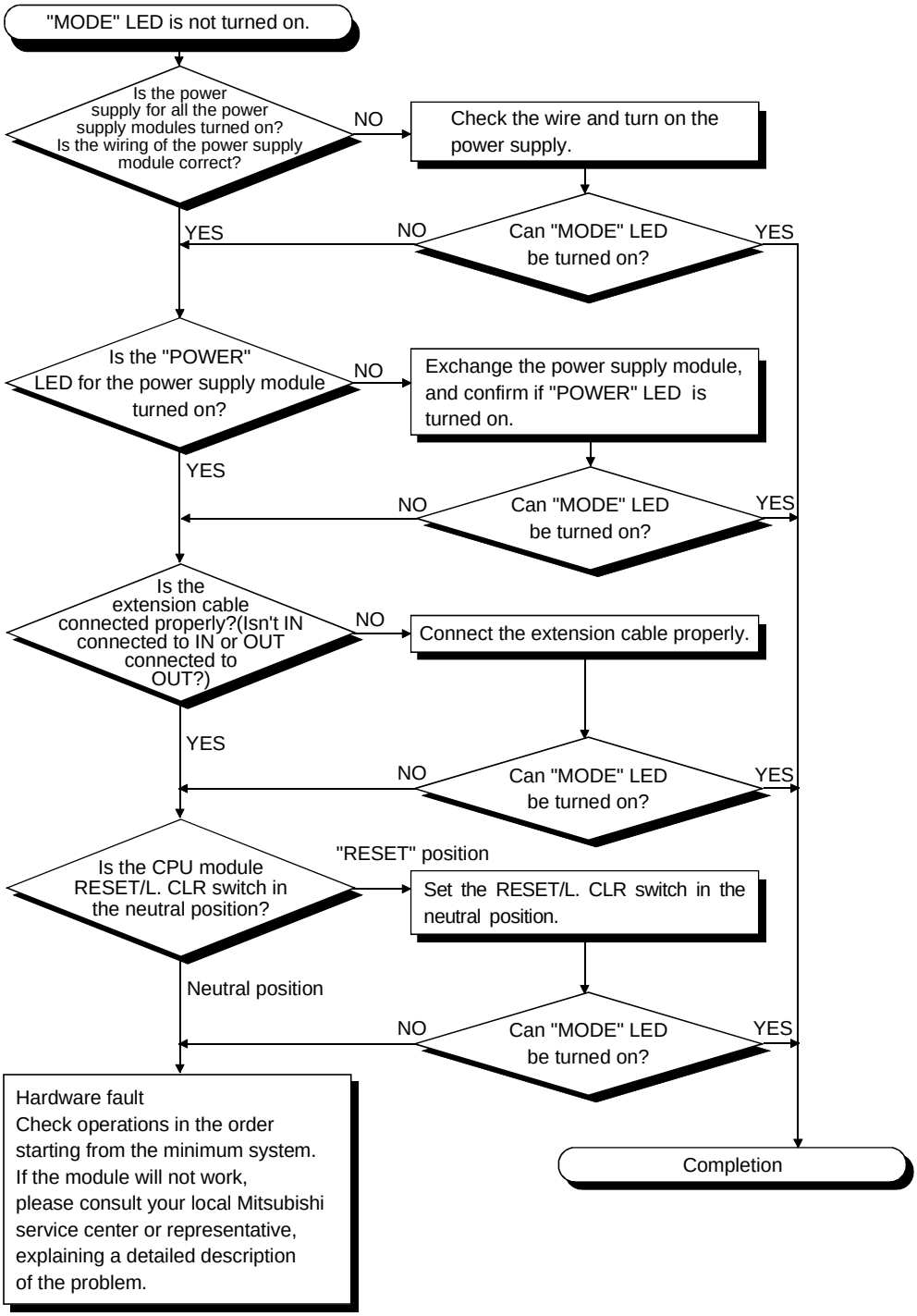
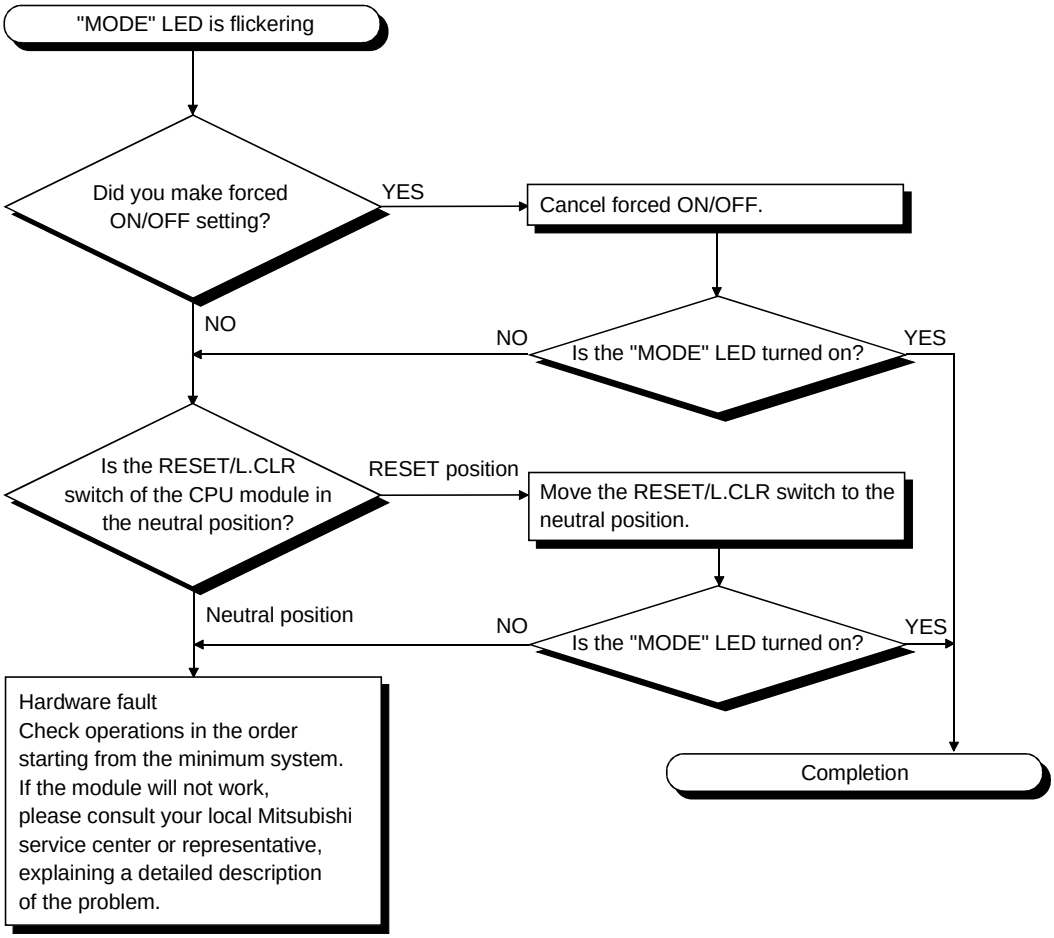
## 11.2.2 Flowchart when "MODE" LED is not turned on

The following shows the flowchart to be followed when the "MODE" LED of the CPU module does not turn on at PLC power-on.


"MODE" LED is not turned on.
Is the power supply for all the power supply modules turned on? Is the wiring of the power supply module correct?
NO
Check the wire and turn on the power supply.
YES
NO
Can "MODE" LED be turned on?
YES
Is the "POWER" LED for the power supply module turned on?
NO
Exchange the power supply module, and confirm if "POWER" LED is turned on.
YES
NO
Can "MODE" LED be turned on?
YES
Is the extension cable connected properly?(Isn't IN connected to IN or OUT connected to OUT?)
NO
Connect the extension cable properly.
YES
NO
Can "MODE" LED be turned on?
YES
"RESET" position
Is the CPU module RESET/L. CLR switch in the neutral position?
Set the RESET/L. CLR switch in the neutral position.
Neutral position
NO
Can "MODE" LED be turned on?
YES
Hardware fault
Check operations in the order starting from the minimum system.
If the module will not work, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

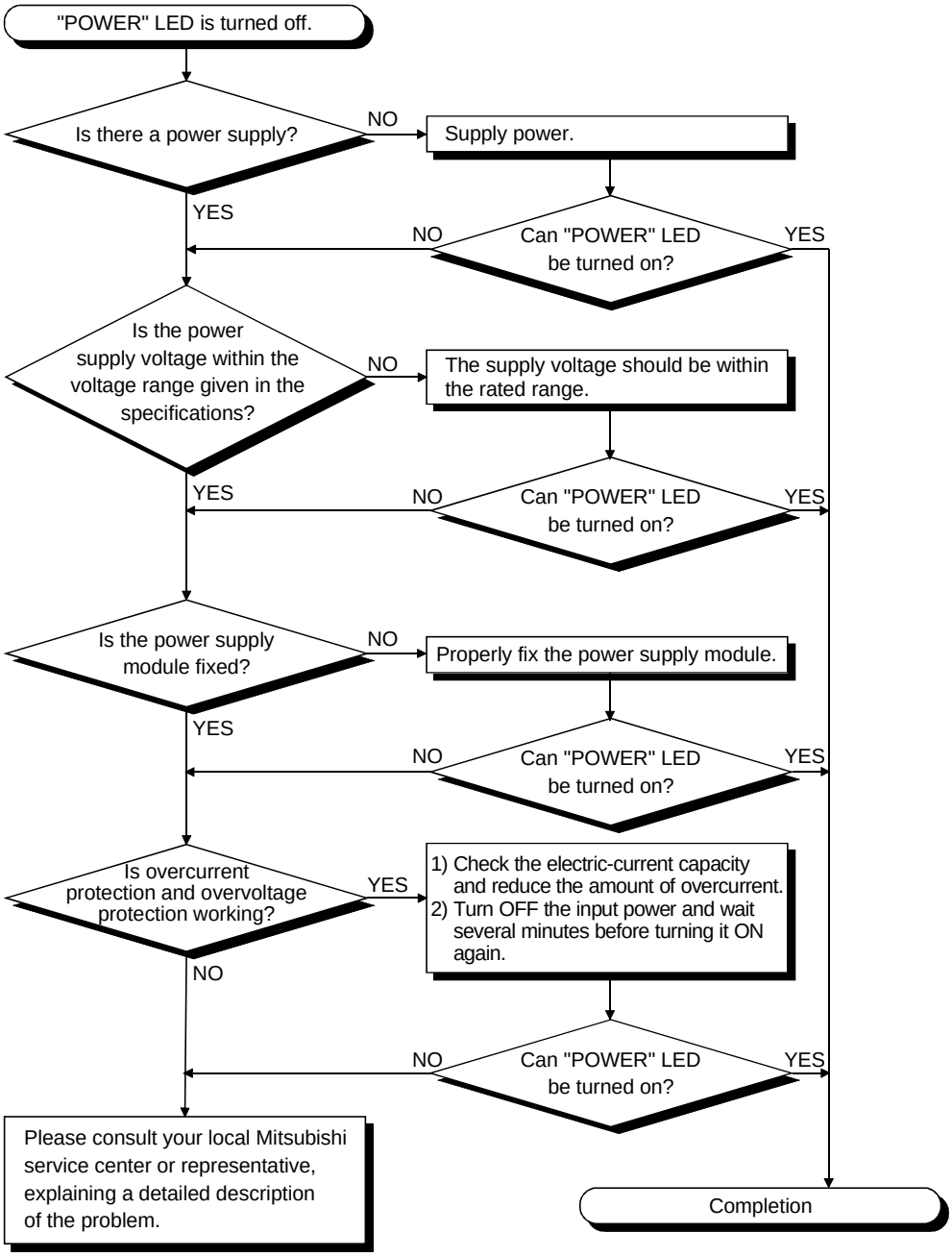
## 11.2.3 When "MODE" LED is flickering

The following shows the flowchart to be followed when the "MODE" LED of the CPU module flickers at PLC power-on, at operation start or during operation.


"MODE" LED is flickering
Did you make forced ON/OFF setting?
YES
Cancel forced ON/OFF.
NO
NO
Is the "MODE" LED turned on?
YES
Is the RESET/L.CLR switch of the CPU module in the neutral position?
RESET position
Move the RESET/L.CLR switch to the neutral position.
Neutral position
NO
Is the "MODE" LED turned on?
YES
Hardware fault
Check operations in the order starting from the minimum system.
If the module will not work, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

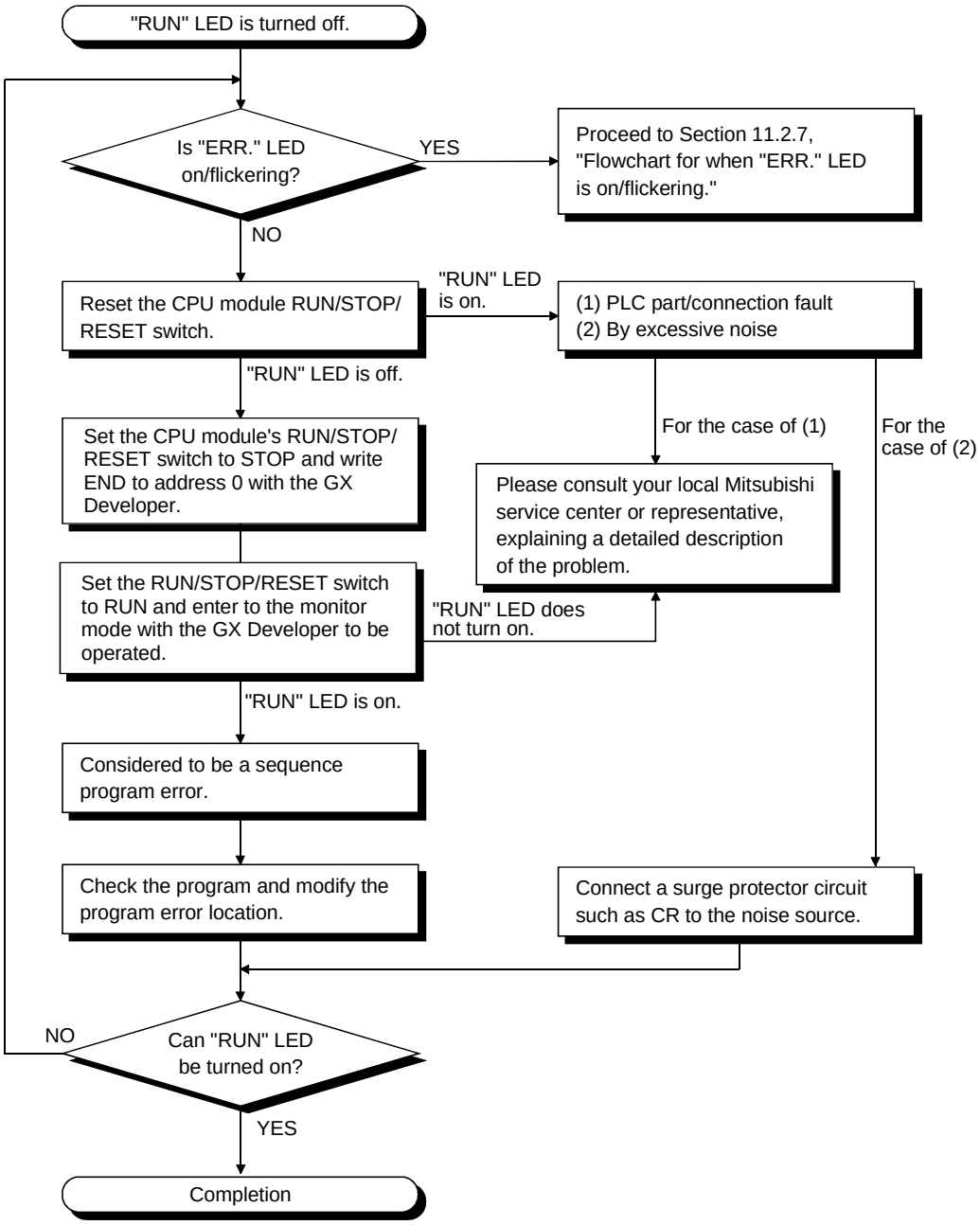
## 11.2.4 Flowchart when "POWER" LED is turned off

The following shows the flowchart to be followed when the "POWER" LED of the power supply module turns off at PLC power-on or during operation.


"POWER" LED is turned off.
Is there a power supply?
NO
Supply power.
YES
NO
Can "POWER" LED be turned on?
YES
Is the power supply voltage within the voltage range given in the specifications?
NO
The supply voltage should be within the rated range.
YES
NO
Can "POWER" LED be turned on?
YES
Is the power supply module fixed?
NO
Properly fix the power supply module.
YES
NO
Can "POWER" LED be turned on?
YES
Is overcurrent protection and overvoltage protection working?
YES
1) Check the electric-current capacity and reduce the amount of overcurrent.
2) Turn OFF the input power and wait several minutes before turning it ON again.
NO
NO
Can "POWER" LED be turned on?
YES
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

## 11.2.5 Flowchart when the "RUN" LED is turned off

The following shows the flowchart to be followed when the "RUN" LED of the CPU module turns off during PLC operation.

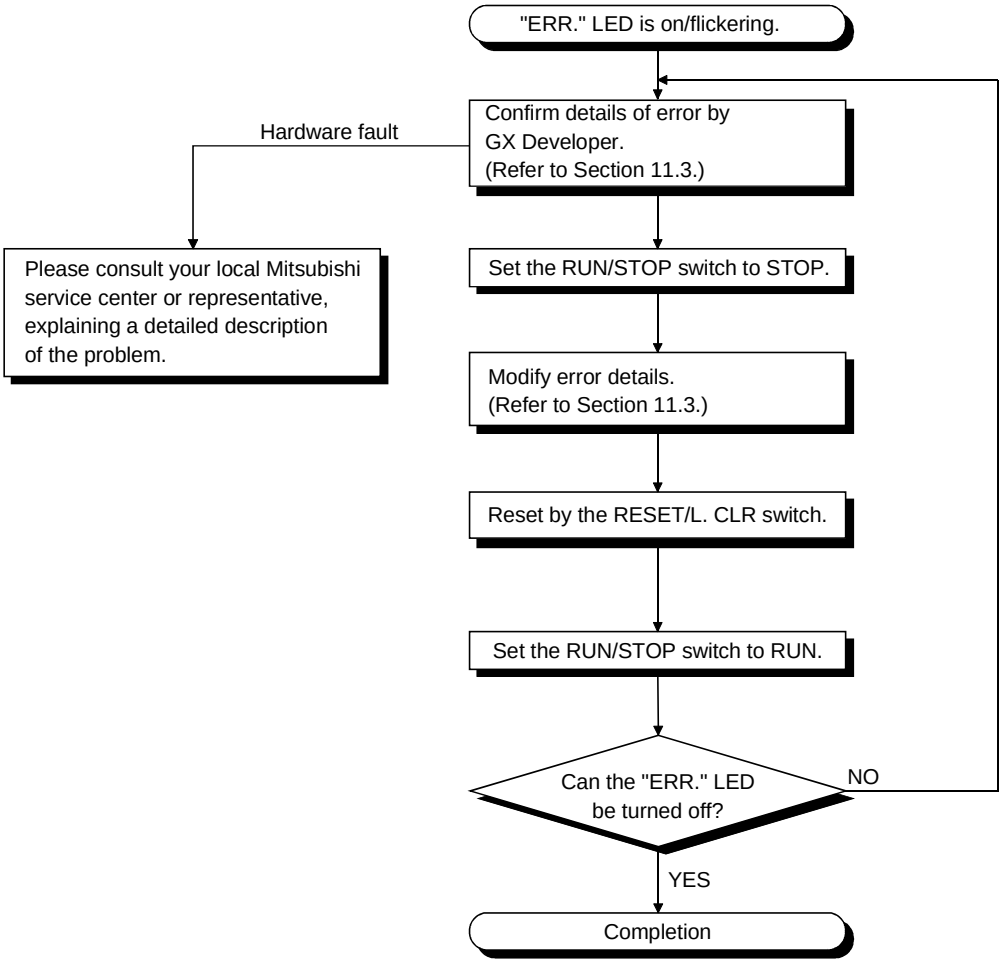

"RUN" LED is turned off.
Is "ERR." LED on/flickering?
YES
Proceed to Section 11.2.7, "Flowchart for when "ERR." LED is on/flickering."
NO
Reset the CPU module RUN/STOP/ RESET switch.
"RUN" LED is on.
(1) PLC part/connection fault
(2) By excessive noise
"RUN" LED is off.
For the case of (1)
For the case of (2)
Set the CPU module's RUN/STOP/ RESET switch to STOP and write END to address 0 with the GX Developer.
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Set the RUN/STOP/RESET switch to RUN and enter to the monitor mode with the GX Developer to be operated.
"RUN" LED does not turn on.
"RUN" LED is on.
Considered to be a sequence program error.
Check the program and modify the program error location.
Connect a surge protector circuit such as CR to the noise source.
NO
Can "RUN" LED be turned on?
YES
Completion

## 11.2.6 When the "RUN" LED is flickering

If the "RUN" LED flickers, follow the steps below.
The Process CPU flickers the "RUN" LED when the RUN/STOP switch is set from STOP to RUN after the programs or parameters are written in the CPU module during the stoppage.
Though this is not the trouble with the CPU module, the operation of the CPU module is stopped.
To bring the CPU module into RUN status, reset the CPU module with the RESET/L.CLR or set the RUN/STOP switch again from STOP to RUN.
The "RUN" LED turns on.

## 11.2.7 Flowchart when "ERR." LED is on/flickering

The following shows the flowchart to be followed when the "ERR." LED of the CPU module turns on or flickers at PLC power-on, at operation start or during operation.


"ERR." LED is on/flickering.
Confirm details of error by GX Developer. (Refer to Section 11.3.)
Hardware fault
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Set the RUN/STOP switch to STOP.
Modify error details. (Refer to Section 11.3.)
Reset by the RESET/L. CLR switch.
Set the RUN/STOP switch to RUN.
Can the "ERR." LED be turned off?
NO
YES
Completion

### 11.2.8 When "USER" LED is turned on

If the "USER" LED turns on, follow the steps described below.
The "USER" LED turns on when an error is detected by the CHK instruction or the annunciator (F) turns on.
If the "USER" LED is on, monitor the special relays SM62 and SM80 in the monitor mode of GX Developer.

- When M62 has turned ON
  The annunciator (F) is ON.
  Using SD62 to SD79, check the error cause.
- When SM80 has turned ON
  The "USER" LED was on by the execution of the CHK instruction.
  Using SD80, check the error cause.

Eliminate the error cause after confirming it.
The "USER" LED can be turned off by:

- Making a reset with the RESET/L.CLR switch; or
- Executing the LEDR instruction in the sequence program.

REMARK

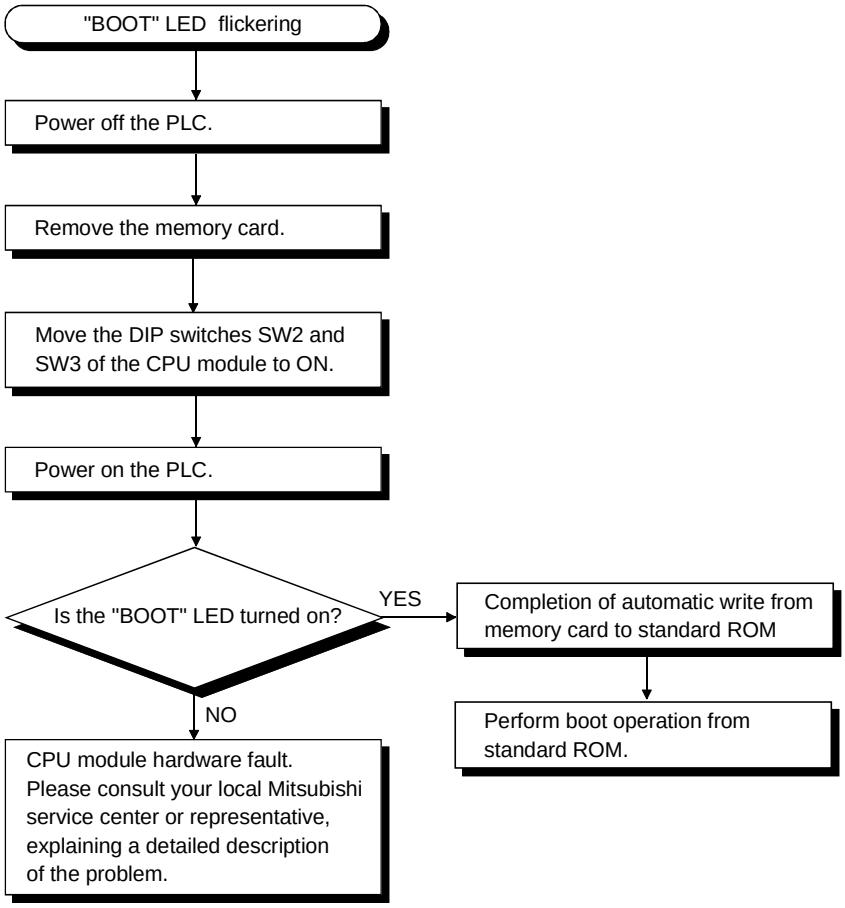
When the RESET/L.CLR switch is tilted to L.CLR several times for latch clear operation, the "USER" LED flickers to indicate that the latch clear processing is under operation.
When the RESET/L.CLR switch is further tilted to L.CLR while the "USER" LED flickers, the "USER" LED turns off and terminates the latch clear processing.

### 11.2.9 When "BAT." LED is turned on

If the "BAT." LED turns on, follow the steps described below.
The "BAT." LED turns on when a low battery capacity is detected.
If the "BAT." LED is on, monitor the special relays and special registers in the monitor mode of GX Developer to check which of the CPU module and SRAM card batteries was lowered in capacity. (SM51 to SM52, SD51 to SD52)
After confirmation, replace the battery with a new one, and reset the CPU module with the RESET/L.CLR switch or run the LEDR instruction, and the "BAT. " LED will turns off.

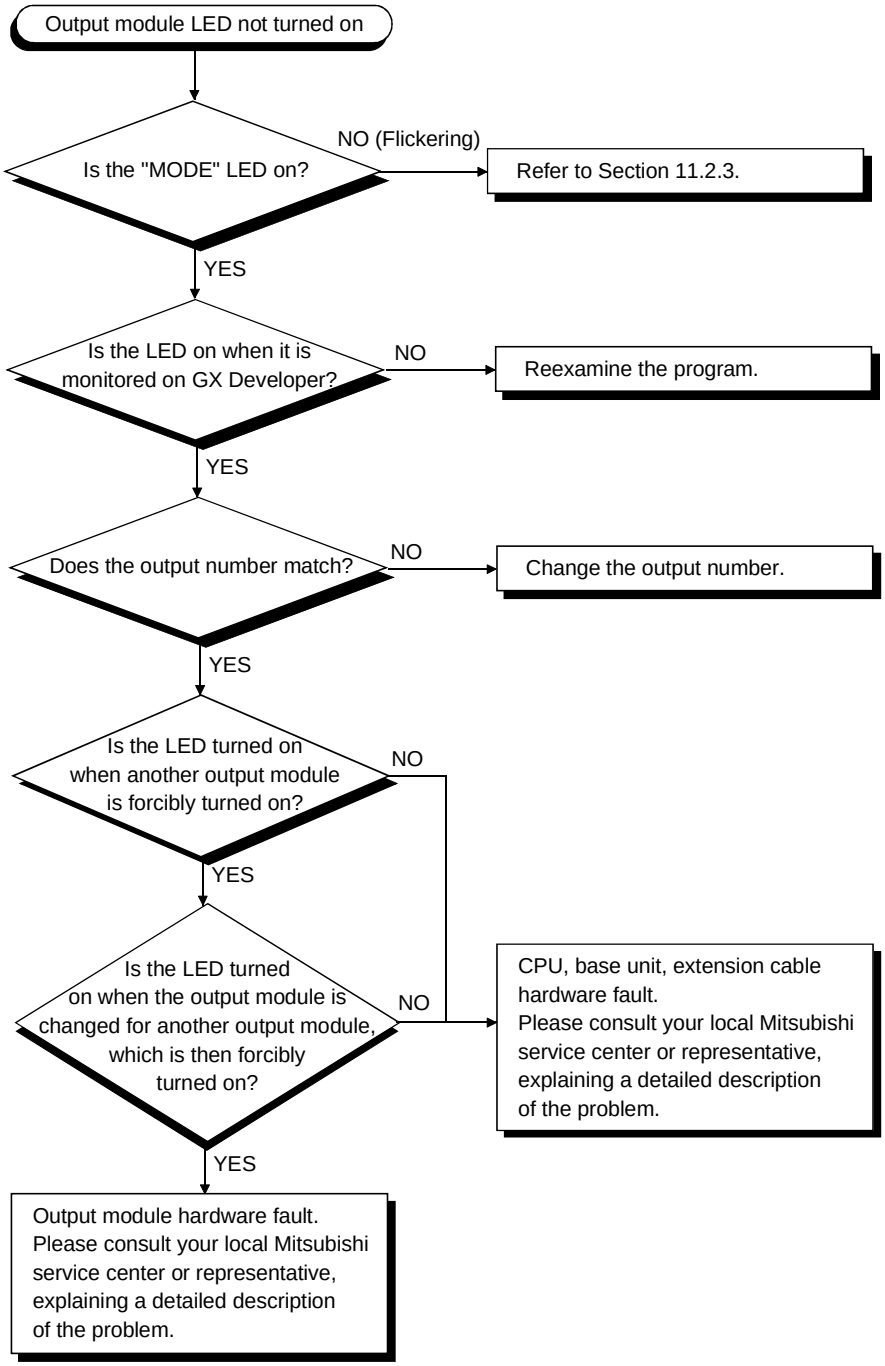
## 11.2.10 When "BOOT" LED is flickering

The following shows the flowchart to be followed when the "BOOT" LED of the CPU module flickers at PLC power-on, at operation start or during operation.


"BOOT" LED flickering
Power off the PLC.
Remove the memory card.
Move the DIP switches SW2 and SW3 of the CPU module to ON.
Power on the PLC.
Is the "BOOT" LED turned on?
YES
Completion of automatic write from memory card to standard ROM
Perform boot operation from standard ROM.
NO
CPU module hardware fault. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

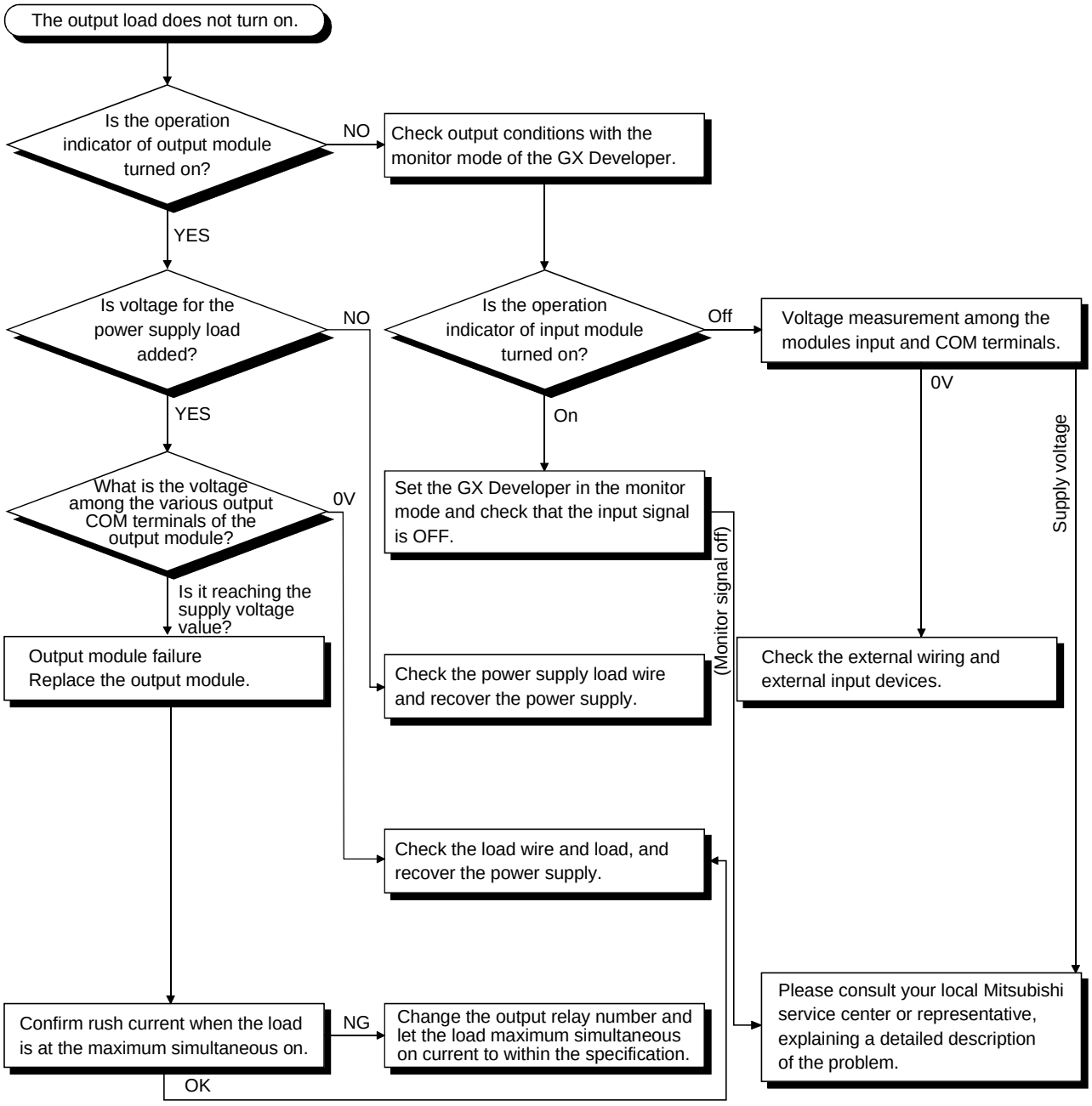
## 11.2.11 When output module LED is not turned on

The following shows the flowchart to be followed when the output module LED does not turn on during PLC operation.


Output module LED not turned on
Is the "MODE" LED on?
NO (Flickering)
Refer to Section 11.2.3.
YES
Is the LED on when it is monitored on GX Developer?
NO
Reexamine the program.
YES
Does the output number match?
NO
Change the output number.
YES
Is the LED turned on when another output module is forcibly turned on?
NO
YES
Is the LED turned on when the output module is changed for another output module, which is then forcibly turned on?
NO
CPU, base unit, extension cable hardware fault.
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
YES
Output module hardware fault.
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

## 11.2.12 Flowchart when output load of output module does not turn on

The following shows the flowchart to be followed when the output load of the output module does not turn on during PLC operation.


The output load does not turn on.
Is the operation indicator of output module turned on?
NO
Check output conditions with the monitor mode of the GX Developer.
YES
Is voltage for the power supply load added?
NO
Is the operation indicator of input module turned on?
Off
Voltage measurement among the modules input and COM terminals.
0V
Supply voltage
YES
On
What is the voltage among the various output COM terminals of the output module?
0V
Set the GX Developer in the monitor mode and check that the input signal is OFF.
(Monitor signal off)
Is it reaching the supply voltage value?
Output module failure
Replace the output module.
Check the power supply load wire and recover the power supply.
Check the external wiring and external input devices.
Check the load wire and load, and recover the power supply.
Confirm rush current when the load is at the maximum simultaneous on.
NG
Change the output relay number and let the load maximum simultaneous on current to within the specification.
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
OK

**POINT**

For the trouble that the input signal to the input module is not turned off, troubleshoot referring to Section 11.5 Examples of I/O ModuleTroubleshooting.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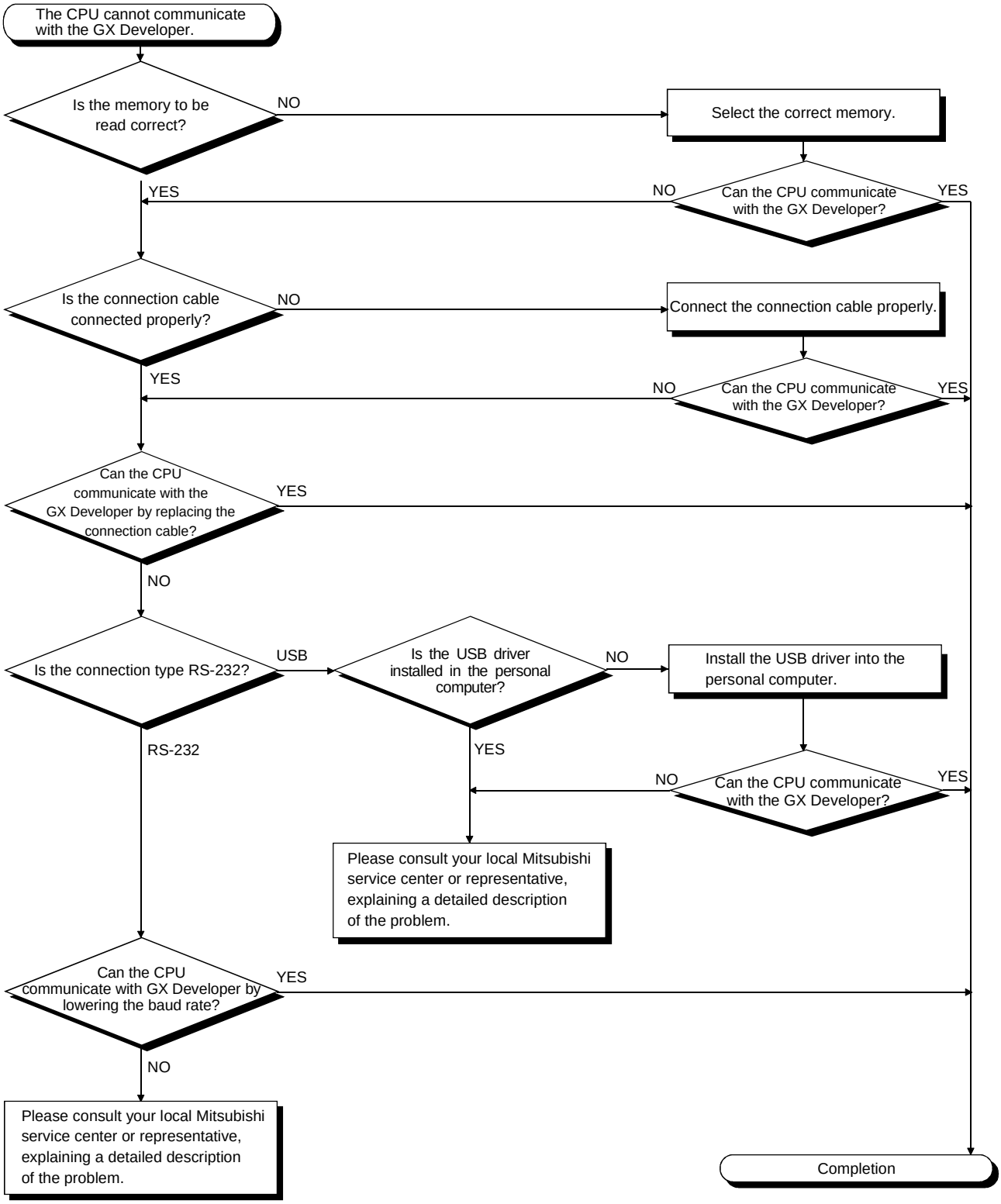
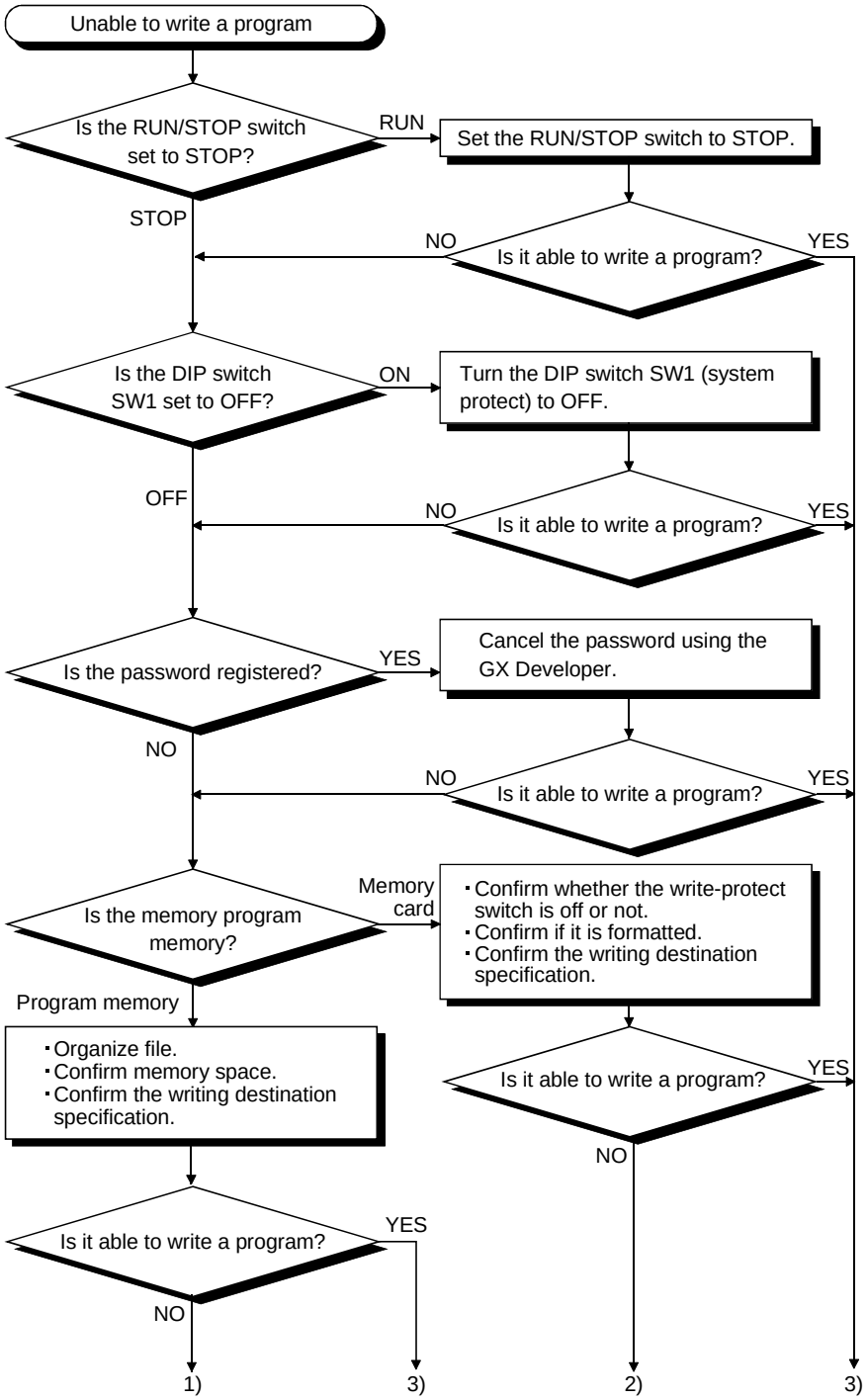
## 11.2.13 Flowchart when unable to read a program

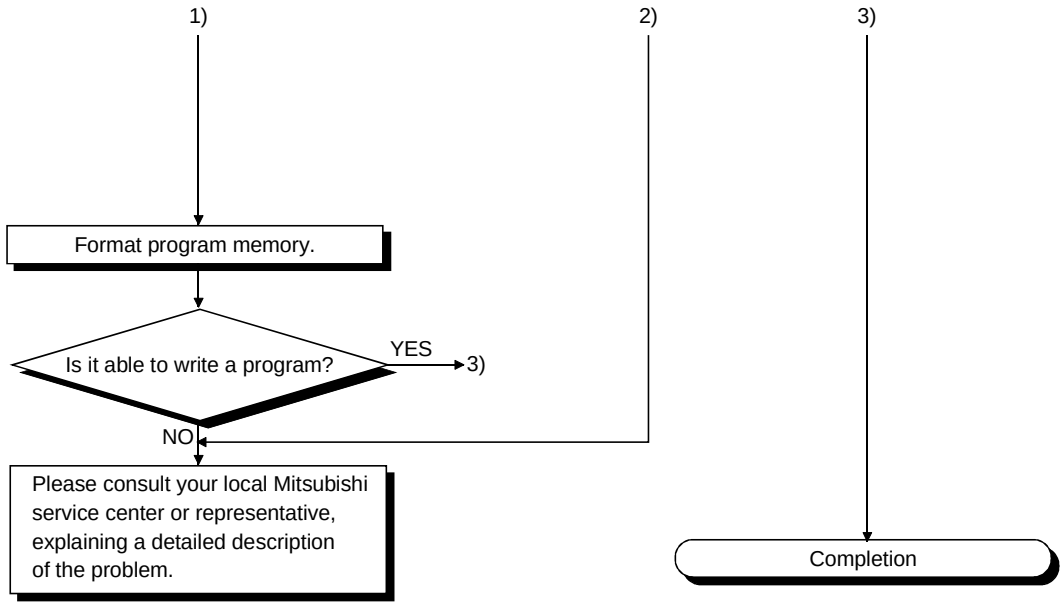
The following shows the flowchart to be followed when communication with GX Developer cannot be made during PLC power-on.


The CPU cannot communicate with the GX Developer.
Is the memory to be read correct?
NO
Select the correct memory.
YES
NO
Can the CPU communicate with the GX Developer?
YES
Is the connection cable connected properly?
NO
Connect the connection cable properly.
YES
NO
Can the CPU communicate with the GX Developer?
YES
Can the CPU communicate with the GX Developer by replacing the connection cable?
YES
NO
Is the connection type RS-232?
USB
Is the USB driver installed in the personal computer?
NO
Install the USB driver into the personal computer.
RS-232
YES
NO
Can the CPU communicate with the GX Developer?
YES
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Can the CPU communicate with GX Developer by lowering the baud rate?
YES
NO
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

## 11.2.14 Flowchart when unable to write a program

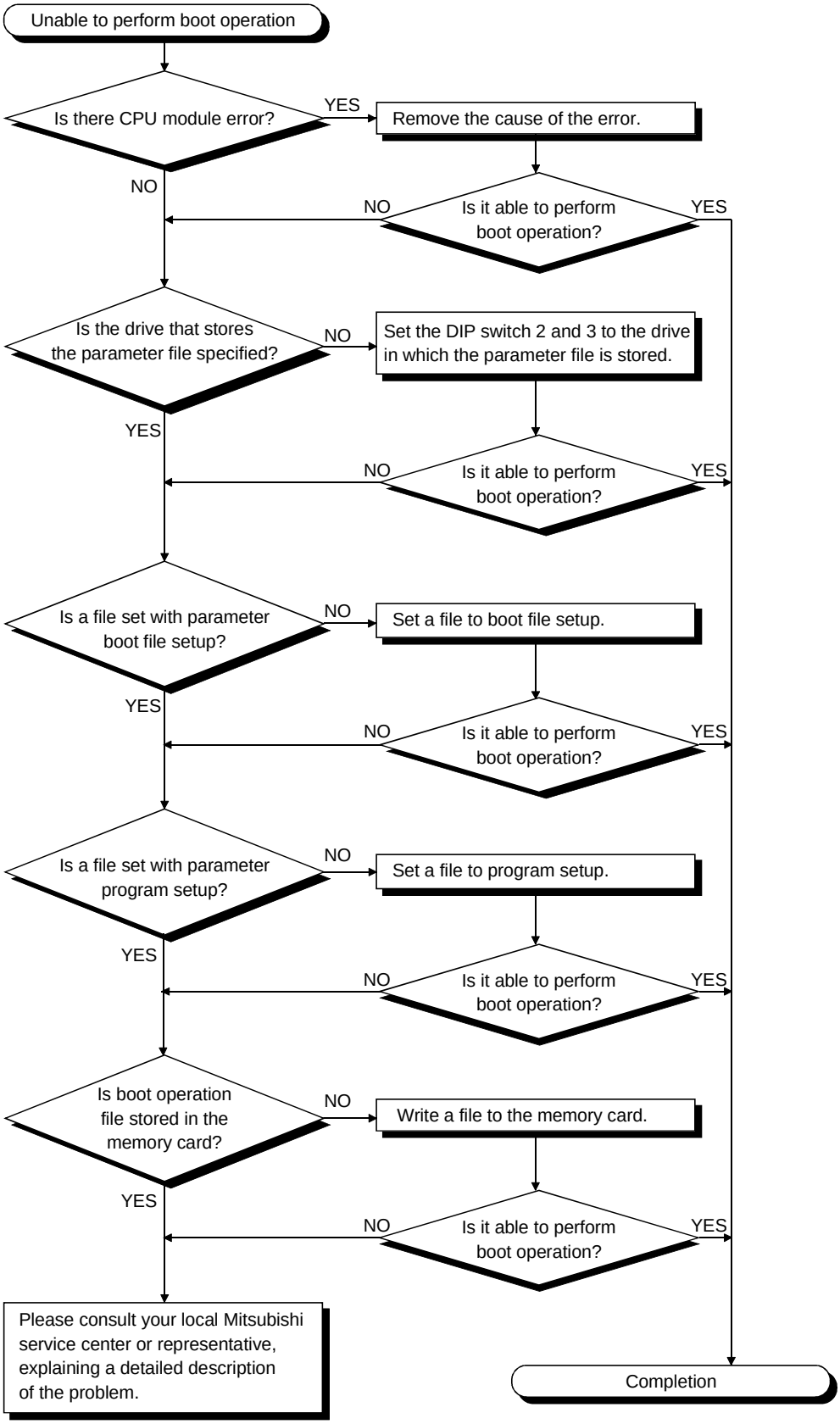
The following shows the flowchart to be followed when programs cannot be written in the CPU module.




1)
2)
3)
Format program memory.
Is it able to write a program?
YES
3)
NO
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

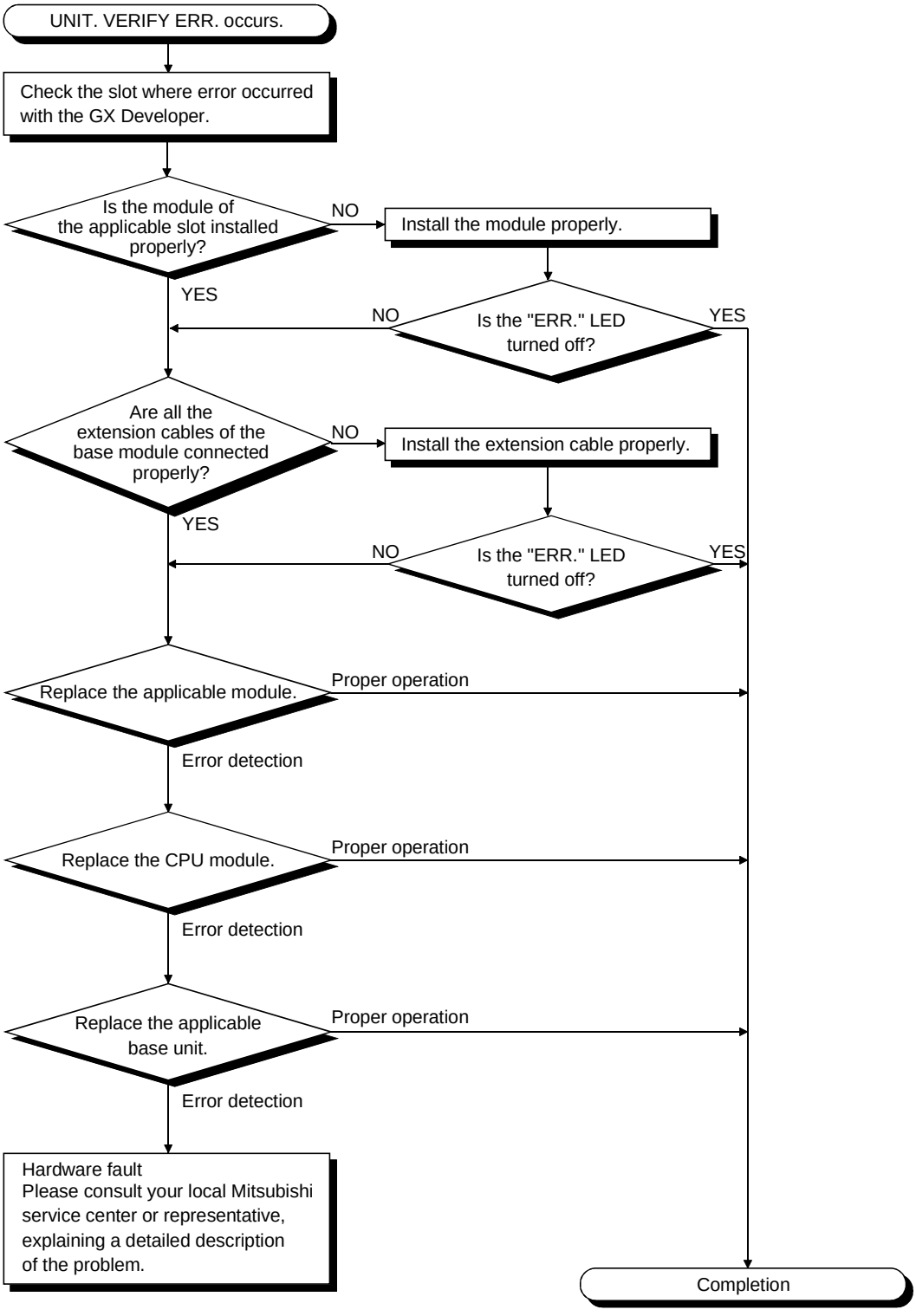
## 11.2.15 Flowchart when it is unable to perform boot operation from memory card

The following shows the flowchart that must be followed when the boot operation of the CPU module cannot be performed using the memory card.


Unable to perform boot operation
Is there CPU module error?
YES
Remove the cause of the error.
NO
NO
Is it able to perform boot operation?
YES
Is the drive that stores the parameter file specified?
NO
Set the DIP switch 2 and 3 to the drive in which the parameter file is stored.
YES
NO
Is it able to perform boot operation?
YES
Is a file set with parameter boot file setup?
NO
Set a file to boot file setup.
YES
NO
Is it able to perform boot operation?
YES
Is a file set with parameter program setup?
NO
Set a file to program setup.
YES
NO
Is it able to perform boot operation?
YES
Is boot operation file stored in the memory card?
NO
Write a file to the memory card.
YES
NO
Is it able to perform boot operation?
YES
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

## 11.2.16 Flowchart when UNIT VERIFY ERR. occurs

The following shows the flowchart to be followed when UNIT VERIFY ERR. occurs at PLC power-on or during operation.





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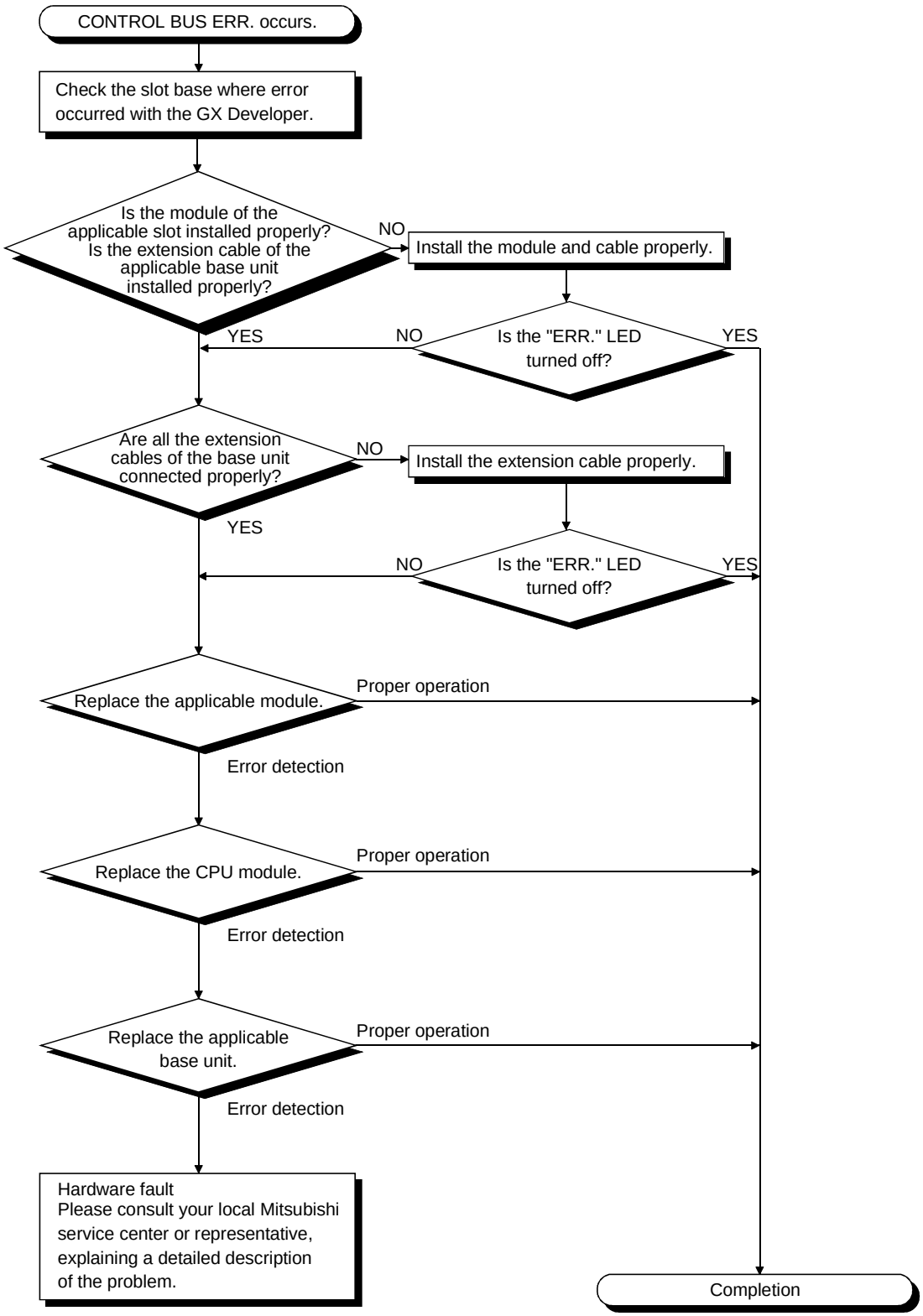
## 11.2.17 Flowchart when CONTROL BUS ERR. occurs

The following shows the flowchart to be followed when CONTROL BUS ERR. occurs at PLC power-on or during operation. This flow chart can be confirmed only when a specific slot/base can be detected by the error code.


CONTROL BUS ERR. occurs.
Check the slot base where error occurred with the GX Developer.
Is the module of the applicable slot installed properly? Is the extension cable of the applicable base unit installed properly?
NO
Install the module and cable properly.
YES
NO
Is the "ERR." LED turned off?
YES
Are all the extension cables of the base unit connected properly?
NO
Install the extension cable properly.
YES
NO
Is the "ERR." LED turned off?
YES
Replace the applicable module.
Proper operation
Error detection
Replace the CPU module.
Proper operation
Error detection
Replace the applicable base unit.
Proper operation
Error detection
Hardware fault
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

## 11.3 Error Code List

If a fault occurs when the PLC power supply is switched on or the CPU module is set to RUN or during RUN, the High Performance model QCPU displays an error (on the LED) using the self-diagnosis function and stores the error information into the special relays SM and special registers SD.

### 11.3.1 Procedure for reading error codes

When an error occurs, the error code and error message can be read by the GX Developer Version 4 or later.
The procedure for reading error codes by the GX Developer is as follows.

1) Start the GX Developer.
2) Connect the CPU module to the peripheral devices.
3) Select [Online] - [Read from PLC] Menu by the GX Developer, and also read the project from the High Performance model QCPU.
4) Select the [Diagnostics] - [Diagnostics PLC] Menu.
5) Click the "Error Jump" button in the PLC diagnostics dialog box to display the error code and error message.
6) Select the [Help] - [PLC error] Menu, and confirm the content of the applicable error code.

For details of the GX Developer operating method, refer to the applicable the GX Developer Operating Manual.

## 11.3.2 Error Code List

The following information deals with error codes and the meanings, causes, and corrective measures of error messages.
"○" in the Corresponding CPU column indicates that the error is applied to Process CPU.
"Rem" indicates compatibility with the remote I/O module.

| Error Code (SD0) ✻1 | Error Messages | Common Information (SD5 to 15) ✻1 | Individual Information (SD16 to 26) ✻1 | LED Status | | Operating Statuses of CPU | Diagnostic Timing | |
|---|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | | |
| 1000 | MAIN CPU DOWN | ——— | ——— | Off | Flicker/On | Stop | Always | |
| 1001 | | | | Off | Flicker | Stop | Always | |
| 1002 | | | | | | | | |
| 1003 | | | | | | | | |
| 1004 | | | | | | | | |
| 1005 | | | | | | | | |
| 1006 | | | | | | | | |
| 1007 | | | | | | | | |
| 1008 | | | | | | | | |
| 1009 | | | | | | | | |
| 1010 | END NOT EXECUTE | ——— | ——— | Off | Flicker | Stop | When an END instruction is executed. | |
| 1011 | | | | | | | | |
| 1012 | | | | | | | | |
| 1101 | RAM ERROR | ——— | ——— | Off | Flicker | Stop | At power ON/At reset | |
| 1102 | | | | | | | | |
| 1103 | | | | | | | | |
| 1104 | | | | | | | | |
| 1105 | | | | | | | | |
| 1200 | OPE. CIRCUIT ERR. | ——— | ——— | Off | Flicker | Stop | At power ON/At reset | |
| 1201 | | | | | | | | |
| 1202 | | | | | | | | |
| 1300 | FUSE BREAK OFF | Unit/module No. | ——— | Off/ON | Flicker/On | Stop/ Continue ✻2 | When an END instruction is executed. | |
| 1310 | I/O INT ERROR | Unit/module No. | ——— | Off | Flicker | Stop | During interrupt | |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

| | Error Code (SD0) ✻1 | Error Contents and Cause | Corrective Action | Corresponding CPU |
|---|---|---|---|---|
| | 1000 | Run mode suspended or failure of main CPU<br>(1) Malfunctioning due to noise or other reason<br>(2) Hardware fault | (1) Measure noise level.<br>(2) Reset and establish the RUN status again.<br>If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○ |
| | 1001<br>1002<br>1003<br>1004<br>1005<br>1006<br>1007<br>1008<br>1009 | The main CPU runs away or has a failure.<br>(1) Malfunctioning due to noise or other reason<br>(2) Hardware fault | (1) Measure noise level.<br>(2) Reset and establish the RUN status again. If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○<br>○<br>+ Rem<br>○ |
| | 1010<br>1011<br>1012 | Entire program was executed without the execution of an END instruction.<br>(1) When the END instruction is executed it is read as another instruction code, e.g. due to noise.<br>(2) The END instruction has been changed to another instruction code somehow. | (1) Measure noise level.<br>(2) Reset and establish the RUN status again.<br>If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○ |
| | 1101 | Error in program memory where CPU sequence program is stored. | This suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○ |
| | 1102 | Error in RAM used as CPU work area. | | |
| | 1103 | Internal CPU device error. | | |
| | 1104 | RAM Address error in CPU module. | | |
| | 1105 | CPU shared memory fault | (1) Measure noise level.<br>(2) Reset and establish the RUN status again.<br>If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○ |
| | 1200 | The circuit that performs CPU internal index modification is not operating properly. | This suggests a CPU module hardware error. Contact your nearest Mitsubishi representative. | ○ |
| | 1201 | Internal CPU hardware (logic) does not operate normally. | | |
| | 1202 | The circuit that executes sequence processing in the CPU does not operate properly. | | |
| | 1300 | There is an output module with a blown fuse. | (1) Check FUSE LED of the output modules and replace the module whose LED is lit.<br>(2) The module with a blown fuse can also be checked with a GX Developer. Monitor special registers SD1300 to SD1331 and check if there is a bit "1," which corresponds to the module with a blown fuse. | ○<br>+ Rem |
| | 1310 | An interruption has occurred although there is no interrupt module. | One of the individual modules is experiencing hardware problems, so check the modules. Contact your nearest Mitsubishi representative and explain the problem with the defective module. | ○ |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.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## Error Code List (Continued)

| Error Code (SD0) ＊1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 1401 | SP. UNIT DOWN | Unit/module No. | ——— | Off/On | Flicker/On | Stop/ Continue ＊3 | At power ON/At reset/ When intelligent function module is accessed. |
| 1402 | SP. UNIT DOWN | Unit/module No. | Program error location | Off/On | Flicker/On | Stop/ Continue ＊3 | When an intelligent function module access instruction is executed. |
| 1403 | | | ——— | | | | When an END instruction is executed. |
| 1411 | CONTROL-BUS ERR. | Unit/module No. | Program error location | Off | Flicker | Stop | At power ON/At reset |
| 1412 | | | | | | | During execution of FROM/TO instruction set. |
| 1413 | CONTROL-BUS. ERR. | ——— | ——— | off | Flicker | Stop | Always |
| 1414 | CONTROL-BUS. ERR. | Unit/module No. | ——— | Off | Flicker | Stop | When an END instruction is executed. |
| | CONTROL-BUS. ERR. | ——— | ——— | off | Flicker | Stop | When an END instruction is executed |
| 1415 | | Base No. | | Off | Flicker | Stop | When an END instruction is executed |
| 1416 | | Unit/module No. | | | | | At power ON/At reset |
| 1500 | AC DOWN | ——— | ——— | On | Off | Continue | Always |
| 1600 | BATTERY ERROR | Drive Name | ——— | ON | On | Continue | Always |
| 1601 | | | | BAT.ALM LED On | | | |
| 2000 | UNIT VERIFY ERR. | Unit/module No. | ——— | Off/On | Flicker/On | Stop/ Continue ＊2 | When an END instruction is executed. |

＊1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
＊2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)
＊3 Stop/continue operation is selectable for each module by setting parameters.


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| | Error Code (SD0) ∗1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 1401 | • There was no response from the intelligent function module during initial communication stage.<br>• The size of the buffer memory of the intelligent function module is wrong. | The CPU module is experiencing hardware problems. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1402 | The intelligent function module was accessed in the program, but there was no response. | This suggests a CPU hardware error. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1403 | • There was no response from the intelligent function module when the END instruction is executed.<br>• An error is detected at the intelligent function module. | The intelligent function module that was being accessed is experiencing hardware problems. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1411 | When performing a parameter I/O allocation the intelligent function module could not be accessed during initial communications.<br>On error occurring, the head I/O number of the corresponding special function module is stored in the common information. | The intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1412 | The FROM/TO instruction set could not be executed, due to a system bus error with a intelligent function module.<br>On error occurring, the program error location is stored in the individual information. | | ○ |
| | 1413 | The High Performance model QCPU of function version A was loaded in a multiple PLC system configuration. | (1) Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B.<br>(2) An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○ |
| | | An error is detected on the system bus.<br>• Wait-length time-out, arbitration time-out. | An intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1414 | Fault of the loaded module was detected.<br>The High Performance model QCPU of function version A was loaded in a multiple PLC system configuration. | (1) Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B.<br>(2) An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○ |
| | | An error is detected on the system bus. | An intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 1415 | Fault of the main or extension base unit was detected. | An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative. | ○ |
| | 1416 | System bus fault was detected at power-on or reset. | | |
| | 1500 | A momentary power supply interruption has occurred.<br>The power supply went off. | Check the power supply. | ○<br>Rem |
| | 1600 | (1) Voltage in the CPU module battery.<br>(2) The CPU module battery is not connected. | (1) Change the battery.<br>(2) If the battery is for program memory, standard RAM or for the back-up power function, install a lead connector. | ○ |
| | 1601 | Voltage of the battery on memory card 1 has dropped below stipulated level. | Change the battery. | |
| | 2000 | I/O module information power ON is changed.<br>I/O module (or intelligent function module) not installed properly or installed on the base unit. | Read the error common information at the GX Developer, and check and/or change the module that corresponds to the numerical value (module number) there.<br>Alternatively, monitor the special registers SD1400 to SD1431 at the GX Developer, and change the fuse at the output module whose bit has a value of "1". | ○<br>Rem |
| | | The High Performance model QCPU of function version A was loaded in a multiple CPU system configuration. | Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B. | ○ |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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## Error Code List (Continued)

| Error Code (SD0) ∗1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing | |
|---|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | | |
| 2100 | SP. UNIT LAY ERR. | Unit/module No. | ——— | Off | Flicker | Stop | At power ON/At reset | |
| 2103 | | | | | | | | |
| 2106 | | | | | | | | |
| 2107 | | | | | | | | |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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| | Error Code (SD0) ∗1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 2100 | Slot loaded with the QI60 is set to other than the Inteli (intelligent function module) or Interrupt (interrupt module) in the parameter I/O assignment. | Make setting again to match the parameter I/O assignment with the actual loading status. | ○ |
| | | (1) In the parameter I/O allocation settings, an Inteli (intelligent function module) was allocated to a location reserved for an I/O module or vice versa.<br>(2) In the parameter I/O allocation settings, a module other than CPU (or nothing) was allocated to a location reserved for a CPU module or vice versa.<br>(3) A general-purpose switch was set to the module with no general-purpose switches. | (1) Reset the parameter I/O allocation setting to conform to the actual status of the intelligent function module and the CPU module.<br>(2) Delete the general-purpose switch settings. | |
| | 2103 | (1) Two or more QI60 modules are loaded in a single-PLC system.<br>(2) Two or more QI60 modules are set to the same control PLC in a multiple-PLC system. | (1) Reduce the number of QI60 module loaded in the single-PLC system to one.<br>(2) Change the number of QI60 module set to the same control PLC to only one in the multiple-PLC system. | ○ |
| | | The QI60 is loaded. | Remove the QI60. | Rem |
| | 2106 | • Five or more MELSECNET/H modules are loaded in a whole multiple-PLC system.<br>• Five or more Q series Ethernet interface modules are loaded in a whole multiple-PLC system. | Reduce the number of modules to four or less in the whole multiple-PLC system. | ○ |
| | | (1) 5 or more MELSECNET/H modules have been installed.<br>(2) 5 or more Q series Ethernet interface modules have been installed.<br>(3) Identical network numbers or station numbers exist in the MELSECNET/10 network system. | (1) Keep the number to 4 or fewer.<br>(2) Keep the number to 4 or fewer.<br>(3) Check the network numbers and station numbers. | ○ + Rem |
| | 2107 | Head X/Y set in the parameter I/O allocation settings is also the head X/Y for another module. | Reset the parameter I/O allocation setting to conform with the actual status of the intelligent function modules. | ○ Rem |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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## Error Code List (Continued)

| Error Code (SD0) ✻1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 2110 | SP. UNIT ERROR | Unit/module No. | Program error location | Off/On | Flicker/On | Stop/ Continue ✻2 | When instruction executed. |
| 2111 | | | | | | | |
| 2112 | SP. UNIT ERROR | Unit/module No. | Program error location | Off/On | Flicker/On | Stop/ Continue ✻2 | When instruction executed/ STOP → RUN |
| 2113 | | FFFFH (fixed) | | | | | |
| 2114 | SP. UNIT ERROR | Unit/module No. | Program error location | Flicker/On | Flicker/On | Continue/ Stop | When instruction is executed |
| 2115 | | | | | | | |
| 2116 | | | | | | | |
| 2117 | | | | | | | |
| 2120 | SP. UNIT LAY ERR. | ——— | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2121 | | | | | | | |
| 2122 | | | | | | | |
| 2124 | | | | | | | |
| 2125 | | | | | | | |
| 2126 | SP. UNIT LAY ERR. | Unit/module No. | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2150 | SP. UNIT VER. ERR. | Unit/module No. | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2200 | MISSING PARA. | Drive Name | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2210 | BOOT ERROR | Drive Name | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2300 | ICM. OPE. ERROR | Drive Name | ——— | Off/On | Flicker/On | Stop/ Continue ✻2 | When memory card is inserted or removed |
| 2301 | | | | | | | |
| 2302 | | | | | | | |
| 2400 | FILE SET ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/At reset |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)


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| | Error Code (SD0) ∗1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 2110 | Station not loaded was specified using the instruction whose target was the CPU share memory. | Read the individual information of the error, check the program corresponding that value (program error location), and make correction. | ○ |
| | | (1) The location designated by the FROM/TO instruction set is not a intelligent function module.<br>(2) The intelligent function module, Network module being accessed is faulty. | (1) Read error individual information, then check and edit the FROM/TO instruction set that corresponds to the numerical value there (Program error location).<br>(2) The intelligent function module that is being accessed has a hardware error. Consult the nearest service center, agent or our branch office and describe the symptom. | |
| | 2111 | The location designated by a link direct device (J□\□) is not a network module. | | |
| | 2112 | (1) The location designated by a intelligent function module dedicated instruction is not a intelligent function module.<br>(2) The network number specified by the network dedicated instruction does not exist, or the network module is not the corresponding one.<br>(3) Alternatively, it is not the relevant intelligent function module. | Read error individual information, then check and edit the special function module (Network module) dedicated instruction that corresponds to the numerical value there (program error location). | ○ + Rem |
| | 2113 | The one specified in the network-dedicated instruction is not a network module, or a relay target network does not exist. | | |
| | 2114 | An instruction, which on execution specifies other stations, has been used for specifying the host station. (An instruction that does not allow the host station to be specified). | Read the individual information of the error, check the program corresponding that value (program error location), and make correction. | ○ |
| | 2115 | An instruction, which on execution specifies the host station, has been used for specifying other stations. (An instruction that does not allow other stations to be specified). | | |
| | 2116 | • An instruction that does not allow the module under the control of another station to be specified is being used for a similar task. | Read the individual information of the error, check the program corresponding that value (program error location), and make correction. | |
| | 2117 | A CPU module that cannot be specified in the instruction dedicated to the multiple PLC system was specified. | | |
| | 2120 | Either a QA1S□B or QA□B is connected. | Use a Q□B. | ○ + Rem |
| | 2121 | The CPU module is installed at other than the CPU slot or slots 0 to 2. | Check the loading position of the CPU module and reinstall it at the correct slot. | |
| | 2122 | QA1S□B is used to the main base unit. | Use Q3□B as the main base unit. | |
| | 2124 | (1) A module is installed at 65th or higher slot.<br>(2) A module is installed at the slot later than the number of slots specified with base allocation setting.<br>(3) A module is installed at the I/O points later than the 4,096th point.<br>(4) A module installed at the 4,096th point occupies higher points. | (1) Remove the module installed at 65th or later slot.<br>(2) Remove the module installed at the slot later than the number of slots specified with base allocation setting.<br>(3) Remove the module installed at the I/O points later than the 4,096th point.<br>(4) Change the last module to a module which does not exceed the 4,096th point. | |
| | 2125 | (1) A module which the High Performance model QCPU cannot recognise has been installed.<br>(2) There was no response form the intelligent function module. | (1) Install a module which can be used with the CPU.<br>(2) The intelligent function module is experiencing hardware problems. Contact your nearest Mitsubishi representative. | |
| | 2126 | CPU module locations in a multiple PLC system are either of the following.<br>(1) There is an empty slot at the left side of the CPU module.<br>(2) A module other than the High Performance model QCPU/Process CPU, such as motion controller or PC CPU module is installed at the left side of the High Performance model QCPU/Process CPU. | (1) Eliminate empty slots between the CPU modules. (Set empty slots on the right side of the CPU modules.)<br>(2) Remove the modules, which are not the High Performance model QCPU modules, loaded between the High Performance model QCPU modules, and fit the slots with the High Performance model QCPUs.<br>Load the motion controller modules on the right side of the High Performance model QCPUs. | ○ |
| | 2150 | In a multiple PLC system, the control CPU of the intelligent function module incompatible with the multiple PLC system is set to other than station 1. | (1) Change the intelligent function module for the one compatible with the multi-CPU system (function version B).<br>(2) Change the setting of the control CPU of the intelligent function module incompatible with the multi-CPU system to station 1. | |
| | 2200 | There is no parameter file at the drive designated by DIP switches as a valid drive. | Check and correct the setting of the parameter enabled drive switch.<br>Put a parameter file in the drive designated by the parameter enabled drive switch. | |
| | 2210 | The contents of the boot file are incorrect. | Check the boot setting. | |
| | 2300 | (1) A memory card was removed without switching the memory card in/out switch OFF.<br>(2) The memory card in/out switch is turned ON although a memory card is not actually installed. | (1) Remove memory card after placing the memory card in/out switch OFF.<br>(2) Turn on the card insert switch after inserting a memory card. | ○ |
| | 2301 | (1) The memory card has not been formatted.<br>(2) Memory card format status is incorrect. | (1) Format memory card.<br>(2) Reformat memory card.<br>Check memory card. | |
| | 2302 | A memory card that cannot be used with the CPU module has been installed. | | |
| | 2400 | The file designated at the PLC file settings in the parameters cannot be found. | Read the error individual information at the GX Developer, check to be sure that the parameter drive name and file name correspond to the numerical values there (parameter number), and correct.<br>Create a file set in parameters, and write it to the CPU module. | ○ |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

## Error Code List (Continued)

| Error Code (SD0) ∗1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 2401 | FILE SET ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/At reset |
| 2410 | FILE OPE. ERROR | File name | Program error location | Off/On | Flicker/ON | Stop/ Continue ∗2 | When instruction is executed |
| 2411 | | | | | | | |
| 2412 | | | | | | | |
| 2413 | | | | | | | |
| 2500 | CAN'T EXE. PRG. | File name | ——— | Off | Flicker | Stop | At power ON/At reset |
| 2501 | | | | | | | |
| 2502 | | | | | | | |
| 2503 | | | | | | | |
| 2504 | | | | | | | |
| 3000 | PARAMETER ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3001 | | | | | | | |
| 3002 | | | | | | | |
| 3003 | PARAMETER ERROR | File name/drive name | Parameter number | Off | Flicker | Stop | When an END instruction is executed. |
| | PARAMETER ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3004 | PARAMETER ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3010 | PARAMETER ERROR | File name/drive name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3012 | | | | | | | |
| 3013 | | | | | | | |
| 3014 | | | | | | | |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)


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| | Error Code (SD0) ✻1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 2401 | Program memory capacity was exceeded by performing boot operation or automatic write to standard ROM. | (1) Check and correct the parameters (boot setting).<br>(2) Delete unnecessary files in the program memory.<br>(3) Choose "Clear program memory" for boot in the parameter so that boot is started after the program memory is cleared. | ○ |
| | | The file designated at the parameter PLC RAS settings fault history area has not been created. | Read the error individual information at the GX Developer, check to be sure that the parameter drive name and file name correspond to the numerical values there (parameter number), and correct.<br>Check the space remaining in the memory card. | |
| | 2410 | The file designated by the sequence program cannot be found. | Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct.<br>Create a file set in parameters, and write it to the CPU module. | ○ |
| | 2411 | The sequence program designated a file that cannot be designated by the sequence program (comment file, etc.). | Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct. | |
| | 2412 | The SFC program file is one that cannot be designated by the sequence program. | | |
| | 2413 | No data has been written to the file designated by the sequence program. | Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct.<br>Check to ensure that the designated file has not been write protected. | |
| | 2500 | There is a program file that uses a device that exceeds the device allocation range designated by the parameter device settings. | Read the error common information at the GX Developer, check to be sure that the parameter device allocation setting and the program file device allocation correspond to the numerical values there (file name), and correct if necessary. | ○ |
| | 2501 | There are multiple program files although "none" has been set at the parameter program settings. | Edit the parameter program setting to "yes".<br>Alternatively, delete unneeded programs. | |
| | 2502 | The program file is incorrect.<br>Alternatively, the file contents are not those of a sequence program. | Check whether the program version is ✻✻✻.QPG, and check the file contents to be sure they are for a sequence program. | ○ |
| | 2503 | There are no program files at all.<br>Two or more SFC normal programs or control programs have been designated. | Check program configuration.<br>Check parameters and program configuration. | |
| | 2504 | | | |
| | 3000 | In a multiple PLC system, the intelligent function module under control of another station is specified in the interrupt pointer setting of the parameter. | (1) Specify the first I/O number of the intelligent function module under control of the host station.<br>(2) Delete the interrupt pointer setting of the parameter. | ○ |
| | | The parameter settings for timer time limit setting, the RUN-PAUSE contact, the common pointer number, the general data processing, number of vacant slots, or system interrupt settings are outside the range that can be used by the CPU module. | (1) Read the error detailed information at the GX Developer, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary.<br>(2) If the error is still generated following the correction of the parameter settings, it is likely that there is a memory error, either in the standard RAM or on the memory card. Contact your nearest Mitsubishi representative. | ○ + Rem |
| | 3001 | Parameter contents have been destroyed. | | |
| | 3002 | When "use the following files" is selected for the file registers in the PLC file setting parameter, the specified file does not exist though the file register capacity has been set. | | ○ |
| | 3003 | The automatic refresh range of the multiple PLC system exceeded the file register capacity. | Change the file register file for the one refresh-enabled in the whole range. | |
| | | The number of devices set at the parameter device settings exceeds the possible CPU module range. | (1) Read the error detailed information at the GX Developer, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary.<br>(2) If the error is still generated following the correction of the parameter settings, it is likely that there is a memory error, either in the internal CPU RAM or on the memory card. Contact your nearest Mitsubishi representative. | |
| | 3004 | The parameter file is incorrect.<br>Alternatively, the contents of the file are not parameters. | Check whether the parameter file version is ✻✻✻.QPA, and check the file contents to be sure they are parameters. | |
| | 3010 | The parameter-set number of CPU modules differs from the actual number in a multiple PLC system. | Match (preset count of multi-CPU setting) - (CPU (empty) setting in I/O assignment) with the actual number of CPUs loaded. | ○ |
| | 3012 | Multiple PLC setting or control PLC setting differs from that of the reference station in a multiple PLC system. | Match the multi-CPU setting or control CPU setting in the parameter with that of the reference station (station 1). | |
| | 3013 | Multiple PLC automatic refresh setting is any of the followings in a multiple PLC system.<br>(1) When a bit device is specified as a refresh device, a number other than a multiple of 16 is specified for the refresh-starting device.<br>(2) The device specified is other than the one that may be specified.<br>(3) The number of send points is an odd number. | Check the following in the multi-CPU automatic refresh parameters and make correction.<br>(1) When specifying the bit device, specify a multiple of 16 for the refresh starting device.<br>(2) Specify the device that may be specified for the refresh device.<br>(3) Set the number of send points to an even number. | |
| | 3014 | • The unit that is used as the standard and the contents that are set are different in the online module change parameter (multiple PLC system parameter) during multiple PLC system construction.<br>• During multiple PLC system construction, the online module change settings are enabled even though the CPU installed doesn't support online module change parameters. | • Make sure that the online module change parameter matches the machine number of the unit that is used as the standard.<br>• Disable the online module change settings when a CPU that doesn't support online module change parameters is installed. | ○ |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

## Error Code List (Continued)

| Error Code (SD0) ∗1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 3100 | LINK PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3101 | | | | | | | |
| 3102 | | | | | | | |
| 3103 | | | | | | | |
| 3104 | | | | | | | |
| 3105 | | | | | | | |
| 3106 | LINK PARA. ERROR | File name/drive name | Parameter number | Off | Flicker | Stop | When an END instruction is executed. |
| | LINK PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3107 | LINK PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3200 | SFC PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | STOP → RUN |
| 3201 | | | | | | | |
| 3202 | | | | | | | |
| 3203 | | | | | | | |
| 3300 | SP. PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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| | Error Code (SD0) ✻1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 3100 | In a multiple PLC system, the MELSECNET/H under control of another station is specified as the first I/O number in the network setting parameter of the MELSECNET/H. | (1) Delete the MELSECNET/H network parameter of the MELSECNET/H under control of another station.<br>(2) Change the setting to the first I/O number of the MELSECNET/H under control of the host station. | ○ |
| | | The network parameters of the MELSECNET/H operating in the ordinary station were rewritten to the control station, or the network parameters of the MELSECNET/H operating in the control station were rewritten to the ordinary station.<br>(The network parameters are reflected on the module side by making a reset.) | Reset the CPU module. | |
| | | (1) The number of actually installed modules is different from that designated in the number of modules setting parameter of MELSECNET/H.<br>(2) The head I/O number of actually installed modules is different from that designated in the network parameter of MELSECNET/H.<br>(3) Some data in the parameter cannot be handled.<br>(4) The station type of MELSECNET/H has been changed while the power is on. (RESET → RUN is required to change the station type.) | (1) Write after correcting network parameters.<br>(2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative. | |
| | 3101 | • When the station number of the MELSECNET/H module is 0, the inter-PLC network parameter setting has been made.<br>• When the station number of the MELSECNET/H module is other than 0, the remote master parameter setting has been made. | Correct the type or station number of the MELSECNET/H module in the parameter to meet the used system. | ○ |
| | | The network No. specified by a parameter is different from that of the actually mounted network.<br>The head I/O No. specified by a parameter is different from that of the actually mounted I/O unit.<br>The network class specified by a parameter is different from that of the actually mounted network.<br>The network refresh parameter of the MELSECNET/H is out of the specified area. | Match the data specified by the parameters with those of the actually mounted network and units. | |
| | | A multi-remote I/O network was configured using a module that does not support the MELSECNET/H multi-remote I/O network. | Use a module that supports the MELSECNET/H multi-remote I/O network. | |
| | 3102 | An error was discovered when the network parameter check was made at the network module. | (1) Write after correcting network parameters.<br>(2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative. | |
| | 3103 | In a multiple PLC system, the Q series Ethernet interface module under control of another station is specified as the first I/O number of the Ethernet setting parameter. | (1) Delete the Ethernet setting parameter of the Q series Ethernet interface module under control of another station.<br>(2) Change the setting to the first I/O number of the Q series Ethernet interface module under control of the host station. | ○ |
| | | • Though the number of Ethernet module is set to one or more in the parameter, the actually mounted number of units is zero.<br>• The head I/O number for the Ethernet module set parameter is different from that of the actually mounted module. | (1) Write after correcting network parameters.<br>(2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative. | ○<br>Rem |
| | 3104 | Ethernet and MELSECNET/10 use the same network number.<br>Network number, station number or group number set by the parameter is out of range.<br>I/O number is out of range. | (1) Write after correcting network parameters.<br>(2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 3105 | In a multiple PLC system, the Q series CC-Link module under control of another station is specified as the first I/O number of the CC-Link setting parameter. | (1) Delete the CC-Link setting parameter of the Q series CC-Link module under control of another station.<br>(2) Change the setting to the first I/O number of the Q series CC-Link module under control of the host station. | ○ |
| | | (1) Though the number of CC-Link module set in the network parameters is one or more, the actually mounted number of units is zero.<br>(2) The head I/O number in the common parameters is different from that of the actually mounted module.<br>(3) The station class for the CC-Link module quantity set parameters is different from that of the actually mounted station. | (1) Write after correcting network parameters.<br>(2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative. | ○<br>+ Rem |
| | 3106 | The CC-Link link refresh range exceeded the file register capacity. | Change the file register file for the one refresh-enabled in the whole range. | ○ |
| | | The network refresh parameter for CC-Link is out of range. | Check the parameter setting. | ○<br>+ Rem |
| | 3107 | The contents of the CC-Link parameter are incorrect. | Check the parameter setting. | ○<br>+ Rem |
| | 3200 | The parameter contents are incorrect. | Write after correcting parameters. | ○ |
| | 3201 | The contents of the SFC block attribute information are incorrect. | | |
| | 3202 | The number of step relays designated in the parameters is less than the number used by the program. | | |
| | 3203 | The execution type set for an SFC program in the parameters is other than the scan execution type. | | |
| | 3300 | The first I/O number in the intelligent function module parameter set on GX Configurator differs from the actual I/O number. | Check the parameter setting. | ○<br>+ Rem |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

## Error Code List (Continued)

| Error Code (SD0) ✻1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 3301 | SP. PARA. ERROR | File name | Parameter number | Off | Flicker | Stop | When an END instruction is executed.<br>At power ON/Reset/ STOP → RUN |
| 3302 | | | | | | | At power ON/Reset/ STOP → RUN |
| 3303 | SP. PARA. ERROR | File name/drive name | Parameter number | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 3400<br>3401 | REMOTE PASS. ERROR | ——— | ——— | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 4000<br>4001<br>4002<br>4003 | INSTRCT CODE ERR. | Program error location | ——— | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 4004 | INSTRCT CODE ERR. | Program error location | ——— | Off | Flicker | Stop | At power ON/Reset/ STOP → RUN |
| 4010 | MISSING END INS. | Program error location | ——— | Off | Flicker | Stop | |
| 4020<br>4021 | CAN'T SET (P) | Program error location | ——— | Off | Flicker | Stop | |
| 4030 | CAN'T SET (I) | Program error location | ——— | Off | Flicker | Stop | |
| 4100<br>4101 | OPERATION ERROR | Program error location | ——— | Off/On | Flicker/On | Stop/ continue ✻2 | When instruction is executed |
| 4102 | | Program | Program error location | | | Stop/ Continue ✻2 | |
| | | Program error location | ——— | | | Stop/ continue ✻2 | |
| 4107 | | Program | Program error location | | | Stop/ Continue ✻2 | |
| 4200 | FOR NEXT ERROR | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4201<br>4202<br>4203 | FOR NEXT ERROR | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻2 The CPU module operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)


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| | Error Code (SD0) ∗1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 3301 | The refresh setting of the intelligent function module exceeded the file register capacity. | Change the file register file for the one which allows refresh in the whole range. | ○ |
| | | The intelligent function module's refresh parameter setting is outside the available range. | Check the parameter setting. | ○ + Rem |
| | 3302 | The intelligent function module's refresh parameter are abnormal. | Check the parameter setting. | ○ |
| | 3303 | In a multiple PLC system, automatic refresh setting or similar parameter setting was made to the intelligent function module under control of another station. | (1) Delete the automatic refresh setting or similar parameter setting of the intelligent function module under control of another station.<br>(2) Change the setting to the automatic refresh setting or similar parameter setting of the intelligent function module under control of the host station. | |
| | 3400 | The first I/O number of the target module in the remote password file is set to other than 0H to 0FF0H. | Change the first I/O number of the target module to within the 0H to 0FF0H range. | |
| | 3401 | Position specified as the first I/O number of the remote password file is incorrect due to one of the following reasons:<br>• Module is not loaded.<br>• Intelligent function module other than QJ71C24(-R2) or Q series Ethernet interface module<br>• QJ71C24(-R2) or Q series Ethernet interface module of function version A | Load the QJ71C24(-R2) or Q series Ethernet interface module of function version B in the position specified as the first I/O number of the remote password file. | ○ |
| | | QJ71C24(-R2) or Q series Ethernet interface module of function version B under control of another station is specified in a multiple PLC system. | (1) Change the setting to the QJ71C24(-R2) or Q series Ethernet interface module of function version B under control of the host station.<br>(2) Delete the remote password setting. | |
| | 4000 | The program contains an instruction code that cannot be decoded. An unusable instruction is included in the program. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4001 | The program contains a dedicated instruction for SFC program although it is not an SFC program. | | |
| | 4002 | The extension instruction designated by the program has an incorrect instruction name. | | ○ + Rem |
| | 4003 | The extension instruction designated by the program has an incorrect number of devices. | | |
| | 4004 | The extension instruction designated by the program a device which cannot be used. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4010 | There is no END (FEND) instruction in the program. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4020 | The total number of internal file pointers used by the program exceeds the number of internal file pointers set in the parameters. | | |
| | 4021 | The common pointer numbers used by individual files overlap. | | |
| | 4030 | The allocation pointer numbers used by individual files are overlap. | | |
| | 4100 | The instruction cannot process the contained data. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4101 | The designated device number for data processed by the instruction exceeds the usable range.<br>Alternatively, the stored data or constants for the devices designated by the instruction exceeds the usable range. | | |
| | 4102 | In a multiple PLC system, the link direct device (J□\G□) was specified for the network module under control of another station. | (1) Delete from the program the link direct device which specifies the network module under control of another station.<br>(2) Using the link direct device, specify the network module under control of the host station. | ○ |
| | | The network number and station number designated with a dedicated network instruction are not correct.<br>The link direct device (j □\W □) is not set correctly.<br>• The module No./network No./character string count specified by the extension instruction is outside the setting range.<br>• The character string (" ") specified by the extension instruction is unusable. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ + Rem |
| | 4107 | 33 or more multiple PLC dedicated instructions were executed from one High Performance model QCPU. | Using the multiple PLC dedicated instruction completion bit, provide interlocks to prevent one CPU module from executing 32 or more multiple PLC dedicated instructions. | ○ |
| | 4200 | No NEXT instruction was executed following the execution of a FOR instruction.<br>Alternatively, there are fewer NEXT instructions than FOR instructions. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4201 | A NEXT instruction was executed although no FOR instruction has been executed.<br>Alternatively, there are more NEXT instructions than FOR instructions. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4202 | More than 16 nesting levels are programmed. | Keep nesting levels at 16 or under. | |
| | 4203 | A BREAK instruction was executed although no FOR instruction has been executed prior to that. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | |

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.

## Error Code List (Continued)

| Error Code (SD0) ✻1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing |
|---|---|---|---|---|---|---|---|
| | | | | RUN | ERROR | | |
| 4210 | CAN'T EXECUTE (P) | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4211 | | | | | | | |
| 4212 | | | | | | | |
| 4213 | | | | | | | |
| 4220 | CAN'T EXECUTE (I) | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4221 | | | | | | | |
| 4223 | | | | | | | |
| 4230 | INST. FORMAT ERR. | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4231 | | | | | | | |
| 4235 | | | | | | | |
| 4400 | SFCP. CODE ERROR | Program error location | ——— | Off | Flicker | Stop | STOP → RUN |
| 4410 | CAN'T SET (BL) | Program error location | ——— | Off | Flicker | Stop | STOP → RUN |
| 4411 | | | | | | | |
| 4420 | CAN'T SET (S) | Program error location | ——— | Off | Flicker | Stop | STOP → RUN |
| 4421 | | | | | | | |
| 4422 | | | | | | | |
| 4500 | SFCP. FORMAT ERR. | Program error location | ——— | Off | Flicker | Stop | STOP → RUN |
| 4501 | | | | | | | |
| 4502 | | | | | | | |
| 4503 | | | | | | | |
| 4504 | | | | | | | |
| 4600 | SFCP. OPE. ERROR | Program error location | ——— | Off/On | Flicker/On | Stop/ Continue ✻2 | When instruction is executed |
| 4601 | | | | | | | |
| 4602 | | | | | | | |
| 4610 | SFCP. EXE. ERROR | Program error location | ——— | On | On | Continue | STOP → RUN |
| 4611 | | | | | | | |
| 4620 | BLOCK EXE. ERROR | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4621 | | | | | | | |
| 4630 | STEP EXE. ERROR | Program error location | ——— | Off | Flicker | Stop | When instruction is executed |
| 4631 | | | | | | | |
| 4632 | | | | | | | |
| 4633 | | | | | | | |
| 5000 | WDT ERROR | Time (value set) | Time (value actually measured) | Off | Flicker | Stop | Always |
| 5001 | | | | | | | |
| 5010 | PRG. TIME OVER | Time (value set) | Time (value actually measured) | On | On | Continue | Always |
| 5011 | | | | | | | |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻3 Can only be detected in a redundant system. Can be detected either in the control system or the standby system.
✻4 Can only be detected in the control system of a redundant system.
✻5 Can only be detected in the standby system of a redundant system.

| | Error Code (SD0) ✻1 | Error Contents and Cause | Corrective Action | Corresponding CPU |
|---|---|---|---|---|
| | 4210 | The CALL instruction is executed, but there is no subroutine at the specified pointer. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4211 | There was no RET instruction in the executed sub-routine program. | | |
| | 4212 | The RET instruction was before the FEND instruction in the main program. | | |
| | 4213 | More than 16 nesting levels are programmed. | Keep nesting levels at 16 or under. | |
| | 4220 | Interrupt input was generated, but no corresponding interrupt pointer was found. | Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4221 | There was no IRET instruction in the executed interrupt program. | | |
| | 4223 | The IRET instruction was before the FEND instruction in the main program. | | |
| | 4230 | The number of CHK and CHKEND instructions is not equal. | | |
| | 4231 | The number of IX and IXEND instructions is not equal. | | |
| | 4235 | The configuration of the check conditions for the CHK instruction is incorrect.<br>Alternatively, a CHK instruction has been used in a low speed execution program. | | |
| | 4400 | No SFCP or SFCPEND instruction in SFC program. | Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4410 | The block number designated by the SFC program exceeds the range. | | |
| | 4411 | Block number designations overlap in SFC program. | | |
| | 4420 | A step number designated in an SFC program exceeds 511. | | |
| | 4421 | Total number of steps in all SFC programs exceed the range | Reduce total number of steps to below the maximum. | |
| | 4422 | Step number designations overlap in SFC program. | Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | |
| | 4500 | The numbers of BLOCK and BEND instructions in an SFC program are not equal. | Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | ○ |
| | 4501 | The configuration of the STEP ✻ to TRAN ✻ to TSET to SEND instructions in the SFC program is incorrect. | | |
| | 4502 | There was no STEPI ✻ instruction in SFC program block. | | |
| | 4503 | The step designated by the TSET instruction in the SFC program does not exist. | | |
| | 4504 | The step designated by the TAND instruction in the SFC program does not exist. | | |
| | 4600 | The SFC program contains data that cannot be processed. | Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.<br>The program is automatically subjected to an initial start. | ○ |
| | 4601 | Exceeds device range that can be designated by the SFC program. | | |
| | 4602 | The START instruction in an SFC program is proceeded by an END instruction. | | |
| | 4610 | The active step information at presumptive start of an SFC program is incorrect. | Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. | |
| | 4611 | Key-switch was reset during RUN when presumptive start was designated for SFC program. | | |
| | 4620 | Startup was executed at a block in the SFC program that was already started up. | | |
| | 4621 | Startup was attempted at a block that does not exist in the SFC program. | | |
| | 4630 | Startup was executed at a block in the SFC program that was already started up. | | ○ |
| | 4631 | Startup was attempted at a block that does not exist in an SFC program. | | |
| | 4632 | There were too many simultaneous active steps in blocks that can be designated by the SFC program. | | |
| | 4633 | There were too many simultaneous active steps in all blocks that can be designated. | | |
| | 5000 | Program scan time for initial execution type programs exceeds the initial execution WDT time setting designated in the PLC RAS parameter. | Read the error individual information at a GX Developer, check the numerical value (time) there, and shorten scan time if necessary. | ○ |
| | 5001 | The program scan time goes over the WDT value set in the parameter PLC RAS parameter. | | |
| | 5010 | (1) The scan time of the program exceeded the constant scan setting time specified in the PC RAS setting parameter.<br>(2) The low speed program execution time specified in the PC RAS setting parameter exceeded the margin time of constant scan. | (1) Review the constant scan setting time.<br>(2) Review the constant scan time and low speed program execution time in the parameter so that the margin time of constant scan may be fully reserved. | ○ |
| | 5011 | Low speed scan type program scan time goes over the low speed execution WDT set in the parameter PC RAS settings. | Read the error individual information at a GX Developer, check the numerical value (time) there, and shorten scan time if necessary. | |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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## Error Code List (Continued)

| Error Code (SD0) ✻1 | Error Messages | Common Information (SD5 to 15) | Individual Information (SD16 to 26) | LED Status | | Operating Statuses of CPU | Diagnostic Timing | |
|---|---|---|---|---|---|---|---|---|
| 7000 | MULT CPU DOWN | Unit/module No. | ——— | Off | Flicker | Stop | Always | |
| 7002 | | | | | | | At power ON/Reset | |
| 7003 | | | | | | | At power ON/Reset | |
| 7010 | MULTI EXE. ERROR | Unit/module No. | ——— | Off | Flicker | Stop | At power ON/Reset | |
| 7020 | MULTI CPU ERROR | Unit/module No. | ——— | On | On | Continue | Always | |
| 9000 | F✻✻✻✻ ✻6 | Program error location | Annunciator number | On / USER LED On | Off | Continue | When instruction is executed | |
| 9010 | <CHK> ERR ✻✻✻-✻✻✻ ✻7 | Program error location | Failure No. | On / USER LED On | Off | Continue | When instruction is executed | |
| 9020 | BOOT OK | ——— | ——— | Off | Flicker | Stop | At power ON/Reset | |
| 10000 | CONT. UNIT ERROR | ——— | ——— | ——— | ——— | ——— | ——— | |

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻6 ✻✻✻✻ indicates detected annunciator number.
✻7 ✻✻✻ indicates detected contact and coil number.

| | Error Code (SD0) ＊1 | Error Contents and Cause | Corrective Action | Corres-ponding CPU |
|---|---|---|---|---|
| | 7000 | (1) In a multiple PLC system, at PLC fault occurred at a station where "all station stop by stop error of PLC " was selected in the operating mode.<br>(2) High Performance model QCPU of function version A was loaded in a multiple PLC system. | (1) Read the individual error information using GX Developer, check the error of the CPU resulting in CPU fault, and remove the error.<br>(2) Remove the High Performance model QCPU of function version A from the main base unit. | ○ |
| | | In a multiple PLC system, station 1 resulted in stop error at power-on and the other stations cannot start. (This error occurred at stations 2 to 4) | Read the individual error information using GX Developer, check the error of the CPU resulting in CPU fault, and remove the error. | |
| | 7002 | (1) There is no response from the target station in a multiple PLC system at initial communication stage.<br>(2) High Performance model QCPU of function version A was loaded in a multiple PLC system configuration. | (1) Reset the High Performance model QCPU and run it again. If the same error is displayed again, it is a hardware fault of any PLC. Consult your sales representative.<br>(2) Remove the High Performance model QCPU of function version A from the main base unit. | |
| | 7003 | There is no response from the target station in a multiple PLC system at initial communication stage. | Reset the High Performance model QCPU and run it again. If the same error is displayed again, it is a hardware fault of any PLC. Consult your sales representative. | |
| | 7010 | (1) Faulty CPU module is loaded in a multiple PLC system.<br>(2) High Performance model QCPU of function version A is loaded in a multiple PLC system configuration. (An error is detected at the High Performance model QCPU of function version B.)<br>(3) In a multiple PLC system, any of stations 2 to 4 was reset during power-on. (This error occurs at only the station which was reset.) | (1) Read the individual error information using GX Developer and replace the CPU module of the faulty machine.<br>(2) Change the station of function version A for function version B.<br>(3) Do not reset the CPU modules of stations 2 to 4. Reset the Process CPU/High Performance model QCPU of station 1 and restart the multi-CPU system. | ○ |
| | 7020 | In a multiple PLC system, a PLC fault occurred at a station where "all station stop by stop error of PLC" was not selected in the operation mode. (The error is detected at the Process CPU/High Performance model QCPU of other than the station where the PLC fault occurred.) | Read the individual information of the error, check the error of the PLC resulting in PLC fault, and remove the error. | |
| | 9000 | Annunciator F was set ON | Read the error individual information at a GX Developer, and check the program corresponding to the numerical value (annunciator number). | ○ |
| | 9010 | Error detected by the CHK instruction. | Read the error individual information at a GX Developer, and check the program corresponding to the numerical value (error number) there. | |
| | 9020 | Storage of data onto ROM was completed normally in automatic write to standard ROM. (BOOT LED also flickers.) | Set the parameter enable drive to standard ROM, switch power on again, and perform boot operation from standard ROM. | ○ |
| | 10000 | In the multiple PLC system, an error occurred in the CPU module other than the Process CPU/High Performance model QCPU. | Use the software package of the corresponding CPU module to check the details of the error that occurred. | ○ |

＊1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.


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## 11.4 Canceling of Errors

The Process CPU can perform the cancel operation for errors only when the errors allow the CPU module to continue its operation.
To cancel the errors, follow the steps shown below.
1) Eliminate the cause of the error.
2) Store the error code to be canceled in the special register SD50.
3) Energize the special relay SM50 (OFF → ON).
4) The error to be canceled is canceled.

After the CPU module is reset by the canceling of the error, the special relays, special registers, and LEDs associated with the error are returned to the status under which the error occurred.
If the same error occurs again after the cancellation of the error, it will be registered again in the error history.

When multiple enunciators(F) detected are canceled, the first one with No. F only is canceled.

**POINT**

When the error is canceled with the error code to be canceled stored in the SD50, the lower two digits of the code is neglected.
(Example)
If the error code 2100 is canceled when the error codes 2100 or 2111 appear, the error code 2111 will also be canceled (all errors with error codes 2100 to 2199 will be canceled).

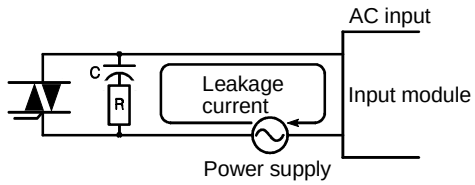
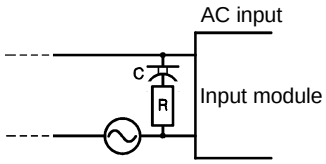
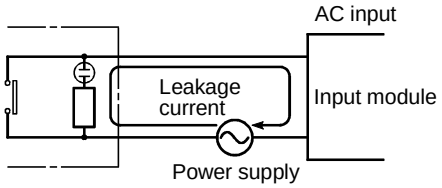
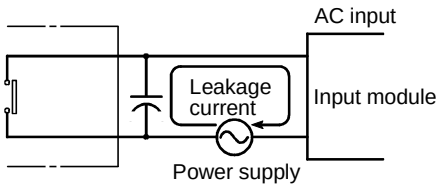
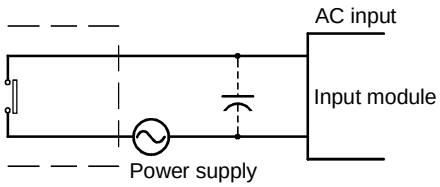
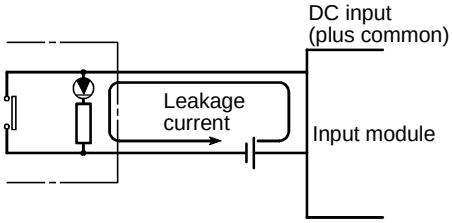
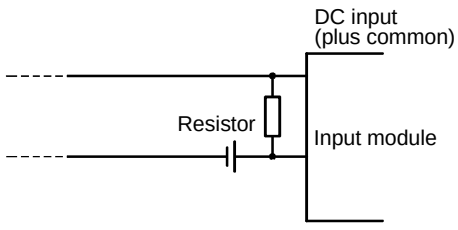
## 11.5 I/O Module Troubleshooting

This chapter explains possible problems with I/O circuits and their corrective actions.

### 11.5.1 Input circuit troubleshooting

This section describes possible problems with input circuits and their corrective actions.

Input Circuit Problems and Corrective Actions

| | Condition | Cause | Corrective Action |
|---|---|---|---|
| Example 1 | Input signal does not turn OFF. | • Leakage current of input switch (e.g. drive by non-contact switch).<br>  | • Connect an appropriate resistor which will make the voltage across the terminals of the input module lower than the OFF voltage value.<br>  <br>It is recommended to use 0.1 to 47 μF + 47 to 120Ω (1/2W) for the CR constant. |
| Example 2 | Input signal does not turn OFF. | • Drive by a limit switch with neon lamp.<br>  | • Same as Example 1.<br>• Or make up another independent display circuit. |
| Example 3 | Input signal does not turn OFF. | • Leakage current due to line capacity of wiring cable.<br>(Line capacity C of twisted pair wire is approx. 100 PF/m).<br>  | • Same as Example 1.<br>• However, leakage current is not generated when the power supply is located in the input equipment side as shown below.<br>  |
| Example 4 | Input signal does not turn OFF. | • Drive by switch with LED indicator.<br>  | • Connect a register which will make the voltage between the input module terminal and common lower than the OFF voltage, as shown below.<br>  <br>* A calculation example of a value for a connected resistor is given on the following page. |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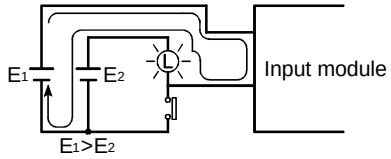
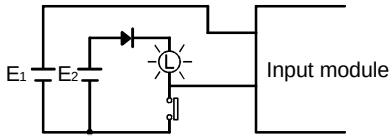
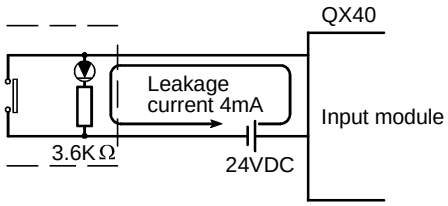
Input Circuit Problems and Corrective Actions (Continued)

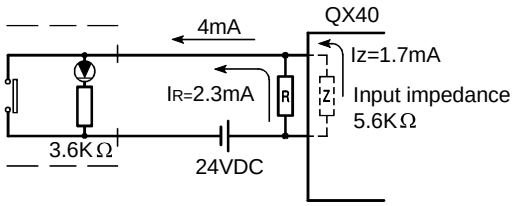
| | Condition | Cause | Corrective Action |
|---|---|---|---|
| Example 5 | Input signal does not turn OFF. | • Sneak path due to the use of two power supplies.<br>  | • Use only one power supply.<br>• Connect a sneak path prevention diode. (Figure below)<br>  |
| Example 6 | False input due to noise | Depending on response time setting, noise is imported as input. | Change response time setting.<br>Example : 1ms → 5ms<br>(Setting of a shorter response time may produce a higher effect on periodic excessive noise.)If no effects are produced by the above, take basic actions to prevent excessive noise form entering, e.g. avoid bundling the power and I/O cables, and suppress noise by adding surge absorbers to such noise sources as relays and conductors used with the same power supply.) |

<Calculation example of Example 4>

Consider a switch with LED indicator connected to the QX40, giving a 4mA leakage current of 4mA when a 24VDC power is turned on.




(1) The 1.7mA OFF current of the QX40 is not satisfied. Hence, connect a resistor as shown below.




(2) Calculate the resistor value R as indicated below.

To satisfy the 1.7mA OFF current of the QX40, the resistor R to be connected may be the one where 2.3mA or more will flow.

$I_R$: $I_Z$=Z (Input impedance): R

$$R \leqq \frac{I_Z}{I_R} \times Z \text{ (Input impedance)} = \frac{1.7}{2.3} \times 5.6 = 4.14[k\Omega]$$

R<4.14kΩ.

Assuming that resistor R is 3.9kΩ, the power capacity W of resistor R is:

W = (input voltage)$^2$ ÷ R = 28.8$^2$ ÷ 3900 = 0.2(W)

(3) The power capacity of the resistor selected is 3 to 5 times greater than the actual current consumption. A 3.9 (kΩ), 0.6 to 1.0 (W) resistor may therefore be connected to the terminal in question.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## 11.6 Special Relay List

Special relays, SM, are internal relays whose applications are fixed in the PLC.
For this reason, they cannot be used by sequence programs in the same way as the normal internal relays.
However, they can be turned ON or OFF as needed in order to control the CPU module and remote I/O modules.

The headings in the table that follows have the following meanings.

| Item | Function of Item |
|---|---|
| Number | • Indicates the number of the special relay. |
| Name | • Indicates the name of the special relay. |
| Meaning | • Indicates the nature of the special relay. |
| Explanation | • Contains detailed information about the nature of the special relay. |
| Set by (When set) | • Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed.<br><Set by><br>S : Set by system<br>U : Set by user (in sequence program or test operation at a GX Developer)<br>S/U : Set by both system and user<br><When set> → indicated only if setting is done by system.<br>Each END : Set during each END processing<br>Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN)<br>Status change : Set only when there is a change in status<br>Error : Set when error is generated<br>Instruction execution : Set when instruction is executed<br>Request : Set only when there is a user request (through SM, etc.) |
| Corresponding ACPU<br>M9□□□ | • Indicates special relay M9□□□ corresponding to the ACPU.<br>(Change and notation when there has been a change in contents)<br>• Items indicated as "New" have been newly added for Process CPU. |
| Corresponding CPU | • Indicates the corresponding CPU type name.<br>○+Rem: Can be applied to Process CPU and MELSECNET/H remote I/O modules.<br>○: Can be applied to Process CPU<br>Remote: Can be applied to the MELSECNET/H remote I/O modules. |

For details on the following items, refer to the following:

- Networks → • For Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)
  • For Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network)
- SFC → QCPU(Q Mode)/QnACPU Programming Manual (SFC)

## Special Relay List

### (1) Diagnostic Information

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM0 | Diagnostic errors | OFF: No error<br>ON : Error | • ON if diagnosis results show error occurrence (Includes when an annunciator is ON, and when an error is detected with CHK instruction)<br>• Stays ON subsequently even if normal operations restored | S (Error) | New | ○+Rem |
| SM1 | Self-diagnosis error | OFF: No self-diagnosis errors<br>ON : Self-diagnosis | • Comes ON when an error occurs as a result of self-diagnosis.<br>• Stays ON subsequently even if normal operations restored | S (Error) | M9008 | |
| SM5 | Error common information | OFF: No error common information<br>ON : Error common information | • When SM0 is ON, ON if there is error common information | S (Error) | New | |
| SM16 | Error individual information | OFF: No error common information<br>ON : Error common information | • When SM0 is ON, ON if there is error individual information | S (Error) | New | |
| SM50 | Error reset | OFF →ON : Error reset | • Conducts error reset operation<br>• See section 11.3 for further information | U | New | |
| SM51 | Battery low latch | OFF: Normal<br>ON : Battery low | • ON if battery voltage at CPU module or memory card drops below rated value. Stays ON subsequently even after normal operation is restored<br>• Synchronous with BAT. ALARM LED | S (Error) | M9007 | ○ |
| SM52 | Battery low | OFF: Normal<br>ON : Battery low | • Same as SM51, but goes OFF subsequently when battery voltage returns to normal. | S (Error) | M9006 | |
| SM53 | AC/DC DOWN detection | OFF: AC/DC DOWN not detected<br>ON : AC/DC DOWN detected | • Comes ON it a momentary power interruption of less than 20ms occurred during use of the AC power supply module, and reset by turning the power OFF, then ON.<br>• Comes ON if a momentary power interruption of less than 10ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON. | S (Error) | M9005 | |
| SM56 | Operation Errors | OFF: Normal<br>ON : Operation error | • ON when operation error is generated<br>• Stays ON subsequently even if normal operations restored | S (Error) | M9011 | ○ |
| SM60 | Blown fuse detection | OFF: Normal<br>ON : Module with blown fuse | • Comes ON even if there is only one output module with a blown fuse, and remains ON even after return to normal<br>• Blown fuse status is checked even for remote I/O station output modules. | S (Error) | M9000 | ○+Rem |
| SM61 | I/O module verification error | OFF: Normal<br>ON : Error | • Comes ON if there is a discrepancy between the actual I/O modules and the registered information when the power is turned on<br>• I/O module verification is also conducted for remote I/O station modules. | S (Error) | M9002 | |
| SM62 | Annunciator detection | OFF: Not detected<br>ON : Detected | • Goes ON if even one annunciator F goes ON. | S (Instruction execution) | M9009 | ○ |
| SM80 | CHK detection | OFF: Not detected<br>ON : Detected | • Goes ON if error is detected by CHK instruction.<br>• Stays ON subsequently even after normal operation is restored. | S (Instruction execution) | New | |
| SM90 | Startup of watchdog timer for step transition (Enabled only when SFC program exists) | OFF: Not started (watchdog timer reset)<br>ON : Started (watchdog timer started) | Corresponds to SD90 | • Goes ON when measurement of step transition watchdog timer is commenced.<br>• Resets watchdog timer when it goes OFF. | U | M9108 |
| SM91 | | | Corresponds to SD91 | | | M9109 |
| SM92 | | | Corresponds to SD92 | | | M9110 |
| SM93 | | | Corresponds to SD93 | | | M9111 |
| SM94 | | | Corresponds to SD94 | | | M9112 |
| SM95 | | | Corresponds to SD95 | | | M9113 |
| SM96 | | | Corresponds to SD96 | | | M9114 |
| SM97 | | | Corresponds to SD97 | | | New |
| SM98 | | | Corresponds to SD98 | | | New |
| SM99 | | | Corresponds to SD99 | | | New |

Special Relay List

(2) System information

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM202 | LED off command | OFF →ON : LED off | • When this relay goes from OFF to ON, the LEDs corresponding to the individual bits at SD202 go off | U | New | ○ |
| SM203 | STOP contact | STOP status | • Goes ON at STOP status | S (Status change) | M9042 | |
| SM204 | PAUSE contact | PAUSE status | • Goes ON at PAUSE status | S (Status change) | M9041 | |
| SM206 | PAUSE enable coil | OFF: PAUSE disabled<br>ON : PAUSE enabled | • PAUSE status is entered if this relay is ON when the remote PAUSE contact goes ON | U | M9040 | |
| | Device test request acceptance status | OFF: Device test not yet executed<br>ON : Device test executed | • Comes ON when the device test mode is executed on GX Developer. | S (Request) | New | Remote |
| SM210 | Clock data set request | OFF: Ignored<br>ON : Set request | • When this relay goes from OFF to ON, clock data being stored from SD210 to SD213 after execution of END instruction for changed scan is written to the clock device. | U | M9025 | ○ |
| SM211 | Clock data error | OFF: No error<br>ON : Error | • ON when error is generated in clock data (SD210 to SD213) value, and OFF if no error is detected. | S (Request) | M9026 | |
| SM213 | Clock data read request | OFF: Ignored<br>ON : Read request | • When this relay is ON, clock data is read to SD210 to SD213 as BCD values. | U | M9028 | ○+Rem |
| SM235 | Online module change flag | OFF:Online module change is not in progress<br>ON: Online module change in progress | • Turns on during online module change. | S (During online module change) | New | ○ |
| SM236 | Online module change complete flag | OFF:Online module change incomplete<br>ON: Online module change complete | • Turns ON for one scan after online module change is complete.<br>• This contact point can only be used by the scan program.(for local unit) | S (When online module change is complete) | New | |
| SM240 | No. 1 CPU reset flag | OFF: PLC No. 1 reset cancel<br>ON : PLC No. 1 resetting | • Goes OFF when reset of the PLC No. 1 is canceled.<br>• Comes ON when the PLC No. 1 is resetting (including the case where the PLC is removed from the base). The other PLCs are also put in reset status. | S (Status change) | New | |
| SM241 | No. 2 CPU reset flag | OFF: PLC No. 2 reset cancel<br>ON : PLC No. 2 resetting | • Goes OFF when reset of the PLC No. 2 is canceled.<br>• Comes ON when the PLC No. 2 is resetting (including the case where the PLC is removed from the base). The other PLCs result in "MULTI CPU DOWN" (error code: 7000). | | | |
| SM242 | No. 3 CPU reset flag | OFF: PLC No. 3 reset cancel<br>ON : PLC No. 3 resetting | • Goes OFF when reset of the PLC No. 3 is canceled.<br>• Comes ON when the PLC No. 3 is resetting (including the case where the PLC is removed from the base). The other PLCs result in "MULTI CPU DOWN" (error code: 7000). | | | |
| SM243 | No. 4 CPU reset flag | OFF: PLC No. 4 reset cancel<br>ON : PLC No. 4 resetting | • Goes OFF when reset of the PLC No. 4 is canceled.<br>• Comes ON when the PLC No. 4 is resetting (including the case where the PLC is removed from the base). The other PLCs result in "MULTI CPU DOWN" (error code: 7000). | | | |
| SM244 | No. 1 CPU error flag | OFF: PLC No. 1 normal<br>ON : PLC No. 1 during stop error | • Goes OFF when the PLC No. 1 is normal (including a continuation error).<br>• Comes ON when the PLC No. 1 is during a stop error. | | | |
| SM245 | No. 2 CPU error flag | OFF: PLC No. 2 normal<br>ON : PLC No. 2 during stop error | • Goes OFF when the PLC No. 2 is normal (including a continuation error).<br>• Comes ON when the PLC No. 2 is during a stop error. | | | |
| SM246 | No. 3 CPU error flag | OFF: PLC No. 3 normal<br>ON : PLC No. 3 during stop error | • Goes OFF when the PLC No. 3 is normal (including a continuation error).<br>• Comes ON when the PLC No. 3 is during a stop error. | | | |
| SM247 | No. 4 CPU error flag | OFF: PLC No. 4 normal<br>ON : PLC No. 4 during stop error | • Goes OFF when the PLC No. 4 is normal (including a continuation error).<br>• Comes ON when the PLC No. 4 is during a stop error. | | | |
| SM250 | Max. loaded I/O read | OFF: Ignored<br>ON : Read | • When this relay goes from OFF to ON, maximum loaded I/O number is read to SD250. | U | New | ○+Rem |
| SM254 | All stations refresh command | OFF: Refresh arrival station<br>ON : Refresh all stations | • Effective for the batch refresh (also effective for the low speed cyclic)<br>• Designate whether to receive arrival stations only or to receive all slave stations. | U (Every END) | New | ○ |

Special Relay List (Continued)

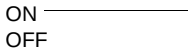
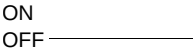
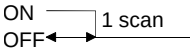
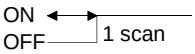
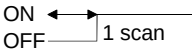
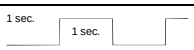
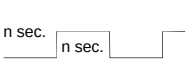
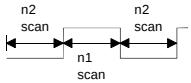
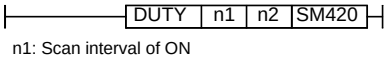
| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM255 | MELSECNET/H module 1 information | OFF: Operative network<br>ON : Standby network | • Goes ON for standby network<br>(If no designation has been made concerning active or standby, active is assumed.) | S (Initial) | New | ○ |
| SM256 | | OFF: Reads<br>ON : Does not read | • For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module. | U | New | |
| SM257 | | OFF: Writes<br>ON : Does not write | • For refresh from CPU to link (B, W, etc.), designate whether to write to the link module. | U | New | |
| SM260 | MELSECNET/H module 2 information | OFF: Operative network<br>ON : Standby network | • Goes ON for standby network<br>(If no designation has been made concerning active or standby, active is assumed.) | S (Initial) | New | |
| SM261 | | OFF: Reads<br>ON : Does not read | • For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module. | U | New | |
| SM262 | | OFF: Writes<br>ON : Does not write | • For refresh from CPU to link (B, W, etc.), designate whether to write to the link module. | U | New | |
| SM265 | MELSECNET/H module 3 information | OFF: Operative network<br>ON : Standby network | • Goes ON for standby network<br>(If no designation has been made concerning active or standby, active is assumed.) | S (Initial) | New | |
| SM266 | | OFF: Reads<br>ON : Does not read | • For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module. | U | New | |
| SM267 | | OFF: Writes<br>ON : Does not write | • For refresh from CPU to link (B, W, etc.), designate whether to write to the link module. | U | New | |
| SM270 | MELSECNET/H module 4 information | OFF: Operative network<br>ON : Standby network | • Goes ON for standby network<br>(If no designation has been made concerning active or standby, active is assumed.) | S (Initial) | New | |
| SM271 | | OFF: Reads<br>ON : Does not read | • For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module. | U | New | |
| SM272 | | OFF: Writes<br>ON : Does not write | • For refresh from CPU to link (B, W, etc.), designate whether to write to the link module. | U | New | |
| SM280 | CC-Link error | OFF: Normal<br>ON : Error | • Goes ON when a CC-Link error is detected in any of the installed QJ61QBT11. Goes OFF when normal operation is restored. | S (Status change) | New | ○+Rem |
| SM320 | Presence/absence of SFC program | OFF: SFC program absent<br>ON : SFC program present | • ON if SFC program is correctly registered, and OFF if not registered.<br>• Goes OFF if SFC dedicated instruction is not correct. | S (Initial) | M9100 | ○ |
| SM321 | Start/stop SFC program | OFF: SFC program stop<br>ON : SFC program start | • Initial value is set at the same value as SM320.<br>(Goes ON automatically if SFC program is present.)<br>• SFC program will not execute if this goes OFF prior to SFC program processing<br>• Starts the SFC program when this relay goes from OFF to ON.<br>• Stops the SFC program when this relay goes from ON to OFF. | S (Initial)<br>U | M9101 format change | |
| SM322 | SFC program start status | OFF: Initial start<br>ON : Restart | • Initial value is set at ON or OFF depending on parameters.<br>• When this relay is OFF, all execution statuses at stop of SFC program are cleared and execution starts from the initial step of the block where the start request is made.<br>• When this relay is ON, execution starts from the execution block and execution step that were active at stop of SFC program.<br>(ON is enabled only when resumptive start has been designated at parameters.)<br>• SM902 is not automatically designated for latch. | S (Initial)<br>U | M9102 format change | |
| SM323 | Presence/absence of continuous transition for entire block | OFF: Continuous transition not effective<br>ON : Continuous transition effective | • When this relay is OFF, transition to one scan/one step occurs in all blocks.<br>• When this relay is ON, transition to one continuous scan occurs in all blocks.<br>• In designation of individual blocks, priority is given to the continuous transition bit of the block.<br>(Designation is checked when block starts.) | U | M9103 | |
| SM324 | Continuous transition prevention flag | OFF: When transition is executed<br>ON : When no transition | • When continuous transition is effective, goes ON when continuous transition is not being executed; goes OFF when continuous transition is being executed.<br>• Normally ON when continuous transition is not effective. | S (Instruction execution) | M9104 | |
| SM325 | Output mode at block stop | OFF: OFF<br>ON : Preserves | When block stops, selects active step operation output.<br>• When this relay is OFF, all coil outputs are set to OFF.<br>• When this relay is ON, coil outputs are maintained. | S (Initial)<br>U | M9196 | |

Special Relay List (Continued)

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM326 | SFC device clear mode | OFF: Clear device<br>ON : Preserves device | Selects the device status when the stopped CPU module is run after the sequence program or SFC program has been modified when the SFC program exists. | U | New | ○ |
| SM327 | Output during end step execution | OFF: OFF<br>ON : Preserves | Selects the output action of the step being held when a block is ended by executing the end step.<br>• When this relay is OFF, all coil outputs are set to OFF.<br>• When this relay is ON, coil outputs are maintained. | S (Initial)<br>U | New | |
| SM330 | Operation mode for low speed execution type program | OFF: Asynchronous mode<br>ON : Synchronous mode | • Select whether low speed execution type programs are executed in asynchronous or synchronous mode.<br>• Asynchronous mode<br>Mode where the operations for the low speed execution type program are continued during the excess time.<br>• Synchronous mode<br>Mode where the operations for the low speed execution type program are started from the next scan even when there is the excess time. | U | New | |
| SM390 | Access execution flag | When ON, access to the intelligent function module is completed | • Stores the status of the intelligent function module access instruction executed immediately before.<br>(This information will be overwritten when the intelligent function module access instruction is executed again.)<br>• This flag is used by the user in a program as the completion bit. | S<br>(Status change) | New | |

## Special Relay List

### (3) System clocks/counters

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM400 | Always ON |  | • Normally is ON | S (Every END processing) | M9036 | |
| SM401 | Always OFF |  | • Normally is OFF | S (Every END processing) | M9037 | |
| SM402 | ON for 1 scan only after RUN |  | • After RUN, ON for 1 scan only.<br>• This contact can be used for scan execution type programs only. | S (Every END processing) | M9038 | |
| SM403 | After RUN, OFF for 1 scan only |  | • After RUN, OFF for 1 scan only.<br>• This contact can be used for scan execution type programs only. | S (Every END processing) | M9039 | |
| SM404 | Low speed execution type program ON for 1 scan only after RUN |  | • After RUN, ON for 1 scan only.<br>• This contact can be used for low speed execution type programs only. | S (Every END processing) | New | |
| SM405 | Low speed execution type program After RUN, OFF for 1 scan only |  | • After RUN, OFF for 1 scan only.<br>• This contact can be used for low speed execution type programs only. | S (Every END processing) | New | |
| SM409 | 0.01 second clock | | • This relay repeats ON/OFF at every 5 ms.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program. | S (Status change) | New | ○ |
| SM410 | 0.1 second clock | | • This relay repeats ON/OFF at every predefined constant time.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program. | S (Status change) | M9030 | |
| SM411 | 0.2 second clock | | | | M9031 | |
| SM412 | 1 second clock | | | | M9032 | |
| SM413 | 2 second clock |  | | | M9033 | |
| SM414 | 2n second clock |  | • This relay repeats ON/OFF in accordance with the number of seconds designated by SD414.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program. | S (Status change) | M9034 format change | |
| SM415 | 2n (ms) clock | | • This relay repeats ON/OFF in accordance with the number of milliseconds designated by SD415.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program. | S (Status change) | New | |
| SM420 | User timing clock No.0 |  | • This relay repeats ON/OFF at designated scan intervals.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• The ON/OFF scan intervals are set by the DUTY instruction.<br>  <br>n1: Scan interval of ON<br>n2: Scan interval of OFF | S (Every END processing) | M9020 | ○ |
| SM421 | User timing clock No.1 | | | | M9021 | |
| SM422 | User timing clock No.2 | | | | M9022 | |
| SM423 | User timing clock No.3 | | | | M9023 | |
| SM424 | User timing clock No.4 | | | | M9024 | |
| SM430 | User timing clock No.5 | | • For low speed execution type programs of SM420 to SM424 | S (Every END processing) | New | |
| SM431 | User timing clock No.6 | | | | | |
| SM432 | User timing clock No.7 | | | | | |
| SM433 | User timing clock No.8 | | | | | |
| SM434 | User timing clock No.9 | | | | | |

Special Relay List

(4) Scan information

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM510 | Low speed exection type program execution flag | OFF: Completed or not executed<br>ON : Execution under way. | • Goes ON when low speed execution type program is executed. | S (Every END processing) | New | ○ |
| SM551 | Reads module service interval | OFF: Ignored<br>ON : Read | • Reads the module service interval designated by SD550 to SD551 and SD552 when this relay switches from OFF to ON. | U | New | ○+Rem |

(5) Memory cards

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM600 | Memory card A usable flags | OFF: Unusable<br>ON : Use enabled | • ON when memory card A is ready for use by user | S (Initial) | New | |
| SM601 | Memory card A protect flag | OFF: No protect<br>ON : Protect | • Goes ON when memory card A protect switch is ON | S (Initial) | New | |
| SM602 | Drive 1 flag | OFF: No drive 1<br>ON : Drive 1 present | • Goes ON when drive 1 (card 1 RAM area) is present | S (Initial) | New | |
| SM603 | Drive 2 flag | OFF: No drive 2<br>ON : Drive 2 present | • Goes ON when drive 2 (card 1 ROM area) is present | S (Initial) | New | |
| SM604 | Memory card A in-use flag | OFF: Not in use<br>ON : In use | • Goes ON when memory card A is in use | S (Initial) | New | |
| SM605 | Memory card A remove/insert prohibit flag | OFF: Remove/insert enabled<br>ON : Remove/insert prohibited | • Goes ON when memory card A cannot be inserted or removed | U | New | ○ |
| SM609 | Memory card remove/insert enable flag | OFF: Remove/insert prohibited<br>ON : Remove/insert enabled | • Turned ON by user to enable the removal/insertion of memory card.<br>• Turned OFF by the system after the memory card is removed. | U/S | New | |
| SM620 | Memory card B usable flags | OFF: Unusable<br>ON : Use enabled | • Always ON | S (Initial) | New | |
| SM621 | Memory card B protect flag | OFF: No protect<br>ON : Protect | • Always ON | S (Initial) | New | |
| SM622 | Drive 3 flag | OFF: No drive 3<br>ON : Drive 3 present | • Always ON | S (Initial) | New | |
| SM623 | Drive 4 flag | OFF: No drive 4<br>ON : Drive 4 present | • Always ON | S (Initial) | New | QCPU |
| SM640 | File register use | OFF: File register not in use<br>ON : File register in use | • Goes ON when file register is in use | S (Status change) | New | |
| SM650 | Comment use | OFF: File register not in use<br>ON : File register in use | • Goes ON when comment file is in use | S (Status change) | New | |
| SM660 | Boot operation | OFF: Internal memory execution<br>ON : Boot operation in progress | • Goes ON while boot operation is in process<br>• Goes OFF if boot designation switch is OFF | S (Status change) | New | ○ |
| SM672 | Memory card A file register access range flag | OFF: Within access range<br>ON : Outside access range | • Goes ON when access is made to area outside the range of file register R of memory card A (Set within END processing.)<br>• Reset at user program | S/U | New | |

(6) Instruction-Related Special Relays

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM700 | Carry flag | OFF: Carry OFF<br>ON : Carry ON | • Carry flag used in application instruction | S (Instruction execution) | M9012 | |
| SM701 | Number of output characters selection | OFF: 16 characters output<br>ON : Outputs until NUL | • Outputs up to NUL (00h) ASCII code when SM701 is OFF.<br>• Outputs ASCII code of 16 characters when SM701 is ON. | U | M9049 | |
| SM702 | Search method | OFF: Search next<br>ON : 2-part search | • Designates method to be used by search instruction.<br>• Data must be arranged for 2-part search. | U | New | ○ |
| SM703 | Sort order | OFF: Ascending order<br>ON : Descending order | • The sort instruction is used to designate whether data should be sorted in ascending order or in descending order. | U | New | |
| SM704 | Block comparison | OFF: Non-match found<br>ON : All match | • Goes ON when all data conditions have been met for the BKCMP instruction. | S (Instruction execution) | New | |
| SM710 | CHK instruction priority ranking flag | OFF: Conditions priority<br>ON : Pattern priority | • Remains as originally set when OFF.<br>• CHK priorities updated when ON. | S (Instruction execution) | New | ○ |
| SM715 | EI flag | OFF: During DI<br>ON : During EI | • ON when EI instruction is being executed. | S (Instruction execution) | New | ○ |
| SM720 | Comment read completion flag | OFF: Comment read not completed<br>ON : Comment read completed | • Switches ON for only one scan when COMRD or PRC instruction is completed. | S (Status change) | New | QCPU |
| SM721 | File being accessed | OFF: File not accessed<br>ON : File being accessed | • Switches ON while a file is being accessed by the S.FWRITE, S.FREAD, COMRD, PRC, or LEDC instruction. | S (Status change) | New | |
| SM722 | BIN/DBIN instruction error disabling flag | OFF: Error detection performed<br>ON : Error detection not performed | • Turned ON when "OPERATION ERROR" is suppressed for BIN or DBIN instruction. | U | New | |
| SM736 | PKEY instruction execution in progress flag | OFF: Instruction not executed<br>ON : Instruction execution | • ON when PKEY instruction is being executed. Goes OFF when CR is input, or when input character string reaches 32 characters. | S (Instruction execution) | New | |
| SM737 | Keyboard input reception flag for PKEY instruction | OFF: Keyboard input reception enabled<br>ON : Keyboard input reception disabled | • Goes ON when keyboard input is being conducted. Goes when keyboard input has been stored at the CPU module. | S (Instruction execution) | New | |
| SM738 | MSG instruction reception flag | OFF: Instruction not executed<br>ON : Instruction execution | • Goes ON when MSG instruction is executed. | S (Instruction execution) | New | |
| SM775 | Selection of link refresh processing during COM instruction execution | OFF: Performs link refresh<br>ON : No link refresh performed | • Selects whether only the general data process is performed for the execution of the COM instruction or the link refresh process is also performed. | U | New | ○ |
| SM776 | Enable/disable local device at CALL | OFF: Local device disabled<br>ON : Local device enabled | • Determines whether to enable/disable the local device in the program CALLED at CALL. | U (Status change) | New | |
| SM777 | Enable/disable local device in interrupt program | OFF: Local device disabled<br>ON : Local device enabled | • Determines whether to enable/disable the local device at the execution of interrupt programs. | U (Status change) | New | |

(7) Debug

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM800 | Trace preparation | OFF: Not ready<br>ON : Ready | • Switches ON when the trace preparation is completed. | S (Status change) | New | QCPU |
| SM801 | Trace start | OFF: Suspend<br>ON : Start | • Trace is started when this relay switches ON.<br>• Trace is suspended when this relay switches OFF. (All related special Ms switches OFF.) | U | M9047 | QCPU |
| SM802 | Trace execution in progress | OFF: Suspend<br>ON : Start | • Switches ON during execution of trace. | S (Status change) | M9046 | QCPU |
| SM803 | Trace trigger | OFF →ON: Start | • Trace is triggered when this relay switches from OFF to ON. (Identical to TRACE instruction execution status) | U | M9044 | QCPU |
| SM804 | After trace trigger | OFF: Not after trigger<br>ON : After trigger | • Switches ON after trace is triggered. | S (Status change) | New | QCPU |
| SM805 | Trace completed | OFF: Not completed<br>ON : End | • Switches ON at completion of trace. | S (Status change) | 9043 | QCPU |
| SM820 | Step trace preparation | OFF: Not ready<br>ON : Ready | • Goes ON after program trace registration, at ready. | U | New | ○ |
| SM821 | Step trace starts | OFF: Suspend<br>ON : Start | • When this goes ON, step trace is started<br>• Suspended when OFF (Related special M all OFF) | S (Status change) | M9182 format change | |
| SM822 | Step trace execution underway | OFF: Suspend<br>ON : Start | • Goes ON when step trace execution is underway<br>• Goes OFF at completion or suspension | S (Status change) | M9181 | |
| SM823 | After step trace trigger | OFF: Not after trigger<br>ON : Is after first trigger | • Goes ON if even 1 block within the step trace being executed is triggered.<br>• Goes OFF when step trace is commenced. | S (Status change) | New | |
| SM824 | After Step trace trigger | OFF: Is not after all triggers<br>ON : Is after all triggers | • Goes ON if all blocks within the step trace being executed are triggered.<br>• Goes OFF when step trace is commenced. | S (Status change) | New | |
| SM825 | Step tracecompleted | OFF: Not completed<br>ON : End | • Goes ON at step trace completion.<br>• Goes OFF when step trace is commenced. | S (Status change) | M9180 | |
| SM826 | Trace error | OFF: Normal<br>ON : Errors | • Switches ON if error occurs during execution of trace. | S (Status change) | New | |

(8) Latch area

| Number | Name | Meaning | Explanation | Set by (When Set) | Corresponding ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM910 | RKEY registration flag | OFF: Keyboard input notregistered<br>ON : Keyboard input registered | • Goes ON at registration of keyboard input. OFF if keyboard input is not registered. | S (Instruction execution) | New | QnA |

(9) A to Q/QnA conversion correspondences

Special relays SM1000 to SM1255 are the relays which correspond to ACPU special relays M9000 to M9255 after A to Q/QnA conversion.

All of these special relays are controlled by the system so that users cannot turn them ON/OFF in the program.

If users want to turn these relays ON/OFF, the program should be modified to use QCPU/QnACPU special relays.

For SM1084 and SM1200 through SM1255, however, if a user can turn ON/OFF some of special relays M9084 and M9200 through M9255 before conversion, the user can also turn ON/OFF the corresponding relays among SM1084 and SM1200 through SM1255 after the conversion.

For details on the ACPU special relays, see the user's manuals for the individual CPUs, and MELSECNET or MELSECNET/B Data Link System Reference Manuals.

**POINT**

The processing time may be longer when converted special relays are used with QCPU. Uncheck "A-series CPU compatibility setting" within the PLC system setting in GX Developer parameters when converted special relays are not used.

**REMARK**

The following are additional explanations about the Special Relay for Modification column.

① When a special relay for modification is provided, the device number should be changed to the provided Process CPU special relay.

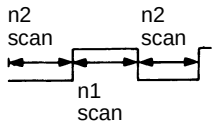
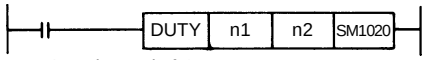
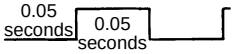
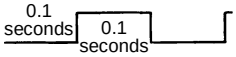
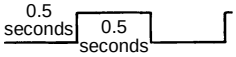
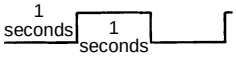
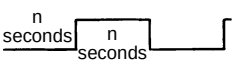
② When ⊟ is provided, the converted special relay can be used for the device number.

③ When ⊠ is provided, the device number does not work with Process CPU.

Special Relay List

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9000 | SM1000 | — | Fuse blown | OFF: Normal<br>ON : Fuse blown module with blown fuse present | • Turned on when there is one or more output units of which fuse has been blown. Remains on if normal status is restored.<br>Output modules of remote I/O stations are also checked fore fuse condition. | ○ |
| M9002 | SM1002 | — | I/O module verification error | OFF: Normal<br>ON : Error | • Turned on if the states of I/O module is different form entered states when power is turned on.<br>Remains on if normal states is restored.<br>I/O module verification is done also to remote I/O station modules.<br>(Reset is enabled only when special registers SD1116 to SD1123 are reset.) | |
| M9004 | SM1004 | — | NIMI link error | OFF: Normal<br>ON : Error | • Turned on when the MINI(S3) link error is detected on even one of the AJ71PT32(S3) modules being loaded.<br>Remains on if normal status is restored. | QnA |
| M9005 | SM1005 | — | AC DOWN detection | OFF: AC DOWN not detected<br>ON : AC DOWN detected | • Comes ON it a momentary power interruption of less than 20ms occurred during use of the AC power supply module, and reset by turning power OFF, then ON. | ○ |
| | | | | | • Comes ON if a momentary power interruption of less than 10ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON. | |
| | | | | | • Comes ON if a momentary power interruption of less than 1ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON. | QnA |

Special Relay List (Continued)

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9006 | SM1006 | — | Battery low | OFF: Normal<br>ON : Battery low | • Turned on when battery voltage reduces to less than specified. Turned off when battery voltage becomes normal. | ○ |
| M9007 | SM1007 | — | Battery low latch | OFF: Normal<br>ON : Battery low | • Turned on when battery voltage reduces to less than specified. Remains on if battery voltage becomes normal. | |
| M9008 | SM1008 | SM1 | Self-diagnosis error | OFF: No error<br>ON : Error | • Turned on when error is found as a result of self-diagnosis. | |
| M9009 | SM1009 | SM62 | Annunciator detection | OFF: No F number detected<br>ON : F number detected | • Turned on when OUT F of SET F instruction is executed. Switched off when SD1124 data is zeroed. | ○ |
| M9011 | SM1011 | SM56 | Operation error flag | OFF: No error<br>ON : Error | • Turned on when operation error occurs during execution of application instruction. Remains on if normal status is restored. | |
| M9012 | SM1012 | SM700 | Carry flag | OFF: Carry OFF<br>ON : Carry ON | • Carry flag used in application instruction. | |
| M9016 | SM1016 | | Data memory clear flag | OFF: Ignored<br>ON : Output claered | • Clears the data memory including the latch range (other than special relays and special registers) in remote run mode from computer, etc. when SM1016 is on. | |
| M9017 | SM1017 | | Data memory clear flag | OFF: Ignored<br>ON : Output claered | • Clears the unlatched data memory (other than special relays and registers) in remote run mode from computer, etc. when SM1017 is on. | |
| M9020 | SM1020 | — | User timing clock No.0 |  | • This relay repeats ON/OFF at designated scan intervals.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset.<br>• The ON/OFF scan intervals are set by the DUTY instruction.<br>  <br>n1: Scan interval of ON<br>n2: Scan interval of OFF | |
| M9021 | SM1021 | — | User timing clock No.1 | | | |
| M9022 | SM1022 | — | User timing clock No.2 | | | |
| M9023 | SM1023 | — | User timing clock No.3 | | | |
| M9024 | SM1024 | — | User timing clock No.4 | | | |
| M9025 | SM1025 | — | Clock data set request | OFF: Ignored<br>ON : Set request present used | • Writes clock data from SD1025 to SD1028 to the clock element after the END instruction is executed during the scan in which SM1025 has changed from off to on. | |
| M9026 | SM1026 | — | Clock data error | OFF: No error<br>ON : Error | • Switched on by clock data (SD1025 to SD1028) error | |
| M9027 | SM1027 | — | Clock data display | OFF: Ignored<br>ON : Display | • Clock data is read from SD1025 to SD1028 and month, day, hour, minute and minute are indicated on the CPU front LED display. | |
| M9028 | SM1028 | — | Clock data read request | OFF: Ignored<br>ON : Read request | • Reads clock data to SD1025 to SD1028 in BCD when SD1028 is on. | |
| M9029 | SM1029 | | Batch processing of data communications requests | OFF: Batch processing not conducted<br>ON : Batch processing conducted | • The SM1029 relay is turned on using a sequence program to process all data communication requests accepted during one scan in the END processing of that scan.<br>• The batch processing of the data communication requests can be turned on and off during running.<br>• The default is OFF (processed one at a time for each END processing in the order in which data communication requests are accepted). | |
| M9030 | SM1030 | — | 0.1 second clock |  | • Generates each of 0.1 sec, 0.2 sec, 1 sec and 2 sec clocks.<br>• This relay does not turn ON/OFF for each scan; it turns ON/OFF when the predefined time elapses even during scanning.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset. | |
| M9031 | SM1031 | — | 0.2 second clock |  | | |
| M9032 | SM1032 | — | 1 second clock |  | | |
| M9033 | SM1033 | — | 2 second clock |  | | |
| M9034 | SM1034 | — | 2n minute clock (1 minute clock) ✻ |  | • Alternates between ON and OFF according to the seconds specified at SD414. (Default: n = 30)<br>• Not turned on or off per scan but turned on and off even during scan if corresponding time has elapsed.<br>• Starts from OFF when the PLC power is turned ON or the CPU module is reset. | |

✻: 1 minute clock indicates the name of the special relay (M9034) of the ACPU.

Special Relay List (Continued)

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9036 | SM1036 | — | Always ON | ON<br>OFF | • Used as dummy contacts of initialization and application instruction in sequence program.<br>• SM1038 and SM1037 are turned on and off without regard to position of key switch on CPU front. SM1038 and SM1039 are under the same condition as RUN status except when the key switch is at STOP position, and turned off and on. Switched off if the key switch is in STOP position. SM1038 is on for one scan only and SM1039 is off for one scan only if the key switch is not in STOP position. | |
| M9037 | SM1037 | — | Always OFF | ON<br>OFF | | |
| M9038 | SM1038 | — | ON for 1 scan only after RUN | ON<br>OFF 1 scan | | |
| M9039 | SM1039 | — | RUN flag(After RUN, OFF for 1 scan only) | ON 1 scan<br>OFF | | |
| M9040 | SM1040 | SM206 | PAUSE enable coil | OFF: PAUSE disabled<br>ON : PAUSE enabled | • When remote pause contact has turned on and SM204 is on, PAUSE mode is set and SM206 is turned on. | |
| M9041 | SM1041 | SM204 | USE statuscontact | OFF: PAUSE not in effect<br>ON : PAUSE in effect | | |
| M9042 | SM1042 | SM203 | STOP status contact | OFF: STOP not in effect<br>ON : STOP in effect | • Switched on when the RUN key switch is in STOP position. | |
| M9043 | SM1043 | SM805 | SamplingTrace completed | OFF: Sampling trace in progress<br>ON : Sampling trace completed | • Turned on upon completion of sampling trace performed the number of times preset by parameter after [STRA] instruction is executed.<br>Reset when [STRAR] instruction is executed. | |
| M9044 | SM1044 | SM803 | Sampling trace | OFF →ON [STRA] Same as execution<br>ON →OFF [STRAR] Same as execution | • Turning on/off SM803 can execute [STRA] / [STRAR] instruction.<br>(SM803 is forcibly turned on/off by a peripheral device.)<br>When switched from OFF to ON: [STRA] instruction<br>When switched from ON to OFF: [STRAR] instruction<br>The value stored in SD1044 is used as the condition for the sampling trace.<br>At scanning, at time → Time (10 msec unit) | ○ |
| M9045 | SM1045 | | Watchdog timer (WDT) reset | OFF: Does not reset WDT<br>ON : Resets WDT | • The SM1015 relay is turned on to reset the WDT when the ZCOM instruction and data communication request batch processing are executed (used when the scan time exceeds 200 ms). | |
| M9046 | SM1046 | SM802 | Sampling trace | OFF: Trace not in progress<br>ON : Trace in progress | • Switched on during sampling trace. | |
| M9047 | SM1047 | SM801 | Sampling trace preparations | OFF: Sampling trace suspended<br>ON : Sampling trace started | • Sampling trace is not executed unless SM801 is turned ON.<br>• Sampling trace is suspended when SM801 goes OFF. | |
| M9049 | SM1049 | SM701 | Selection of number of characters output | OFF: Output until NULL code encountered<br>ON : 16 characters output | • When SM701 is OFF, characters up to NUL (00H) code are output.<br>• When SM701 is ON, ASCII codes of 16 characters are output. | |
| M9051 | SM1051 | | CHG instruction execution disable | OFF: Enabled<br>ON : Disable | • Switched ON to disable the CHG instruction.<br>• Switched ON when program transfer is requested. Automatically switched OFF when transfer is complete. | |
| M9052 | SM1052 | | SEG instruction switch | OFF: 7SEG segment display<br>ON : I/O partial refresh | • When SM1052 is ON, the SEG instruction is executed as an I/O partial refresh instruction.<br>• When SM1052 is OFF, the SEG instruction is executed as a 7-SEG display instruction. | |
| M9054 | SM1054 | SM205 | STEP RUN flag | OFF: STEP RUN not in effect<br>ON : STEP RUN in effect | • Switched on when the RUN key switch is in STEP RUN position. | QnA |
| M9055 | SM1055 | SM808 | Status latch completion flag | OFF: Not completed<br>ON : Completed | • Turned on when status latch is completed. Turned off by reset instruction. | |
| M9056 | SM1056 | | Main side P, I set request | OFF: Other than when P, I set being requested<br>ON : P, I set being requested | • Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete. | ○ |
| M9057 | SM1057 | | Sub side P, I set request | OFF: Other than when P, I set being requested<br>ON : P, I set being requested | | |
| M9058 | SM1058 | | Main program P, I set completion | Momentarily ON at P, I set completion | • Turned ON once when the P, I set has been completed, and then turned OFF again. | |
| M9059 | SM1059 | | Sub program P, I set completion | Momentarily ON at P, I set completion | | |
| M9060 | SM1060 | | Sub program 2 P, I set request | OFF: Other than when P, I set being requested<br>ON : P, I set being requested | • Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete. | |

Special Relay List (Continued)

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9061 | SM1061 | | Sub program 3 P, I set request | OFF: Other than when P, I set being requested<br>ON : P, I set being requested | • Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete. | ○ |
| M9065 | SM1065 | SM711 | Divided processing execution detection | OFF: Divided processing not underway<br>ON : During divided processing | • Turned on when canvas screen transfer to AD57(S1)/AD58 is done by divided processing, and turned off at completion of divided processing. | QnA |
| M9066 | SM1066 | SM712 | Divided processing request flag | OFF: Batch processing<br>ON : Divided processing | • Turned on when canvas screen transfer to AD57(S1)/AD58 is done by divided processing. | |
| M9070 | SM1070 | | A8UPU/A8PUJrequired search time | OFF: Read time not shortened<br>ON : Read time shortened | • Turned ON to shorten the search time in the A8UPU/A8PUJ.<br>(In this case, the scan time is extended by 10 %.)<br>* The A8UPU/A8PUJ cannot be used in the QCPU/QnACPU special relays. | ○ |
| M9081 | SM1081 | SM714 | Communication request registration area BUSY signal | OFF: Empty spaces in communication request registration area<br>ON : No empty spaces in communication request registration area | • Indication of communication enable/disable to remote terminal modules connected to the AJ71PT32-S3, A2C or A52G. | QnA |
| M9084 | SM1084 | | Error check | OFF: Error check executed<br>ON : No error check | • It is set whether the error checks below are performed or not when the END instruction is processed (to set the END instruction processing time).<br>• Check for breakage of fuse.<br>• Collation check of I/O unit<br>• Check of battery | ○ |
| M9091 | SM1091 | | Instruction error flag | OFF: No error<br>ON : Error | • Set when an operation error detail factor is stored at SD1091, and remains set after normal status is restored.<br>• Set when an error occurred at execution of the microcomputer program package, and remains set after normal status is restored. | |
| M9094 | SM1094 | SM251 | I/O change flag | OFF: Replacement<br>ON : No replacement | • After the head address of the required I/O module is set to SD251, switching SM251 on allows the I/O module to be changed in online mode. (One module is only allowed to be changed by one setting.)<br>• To be switched on in the program or peripheral device test mode to change the module during CPU RUN. To be switched on in peripheral device test mode to change the module during CPU STOP.<br>• RUN/STOP mode must not be changed until I/O module change is complete. | QnA |
| M9100 | SM1100 | SM320 | Presence/absence of SFC program | OFF: SFC programs not used<br>ON : SFC programs used | • Turned on if the SFC program is registered, and turned off if it is not. | ○ |
| M9101 | SM1101 | SM321 | Start/stop SFC program | OFF: SFC programs stop<br>ON : SFC programs start | • Should be turned on by the program if the SFC program is to be started. If turned off, operation output of the execution step is turned off and the SFC program is stopped. | |
| M9102 | SM1102 | SM322 | SFC program start status | OFF: Initial Start<br>ON : Continue | • Selects the starting step when the SFC program is restarted using SM322.<br>ON: All execution conditions when the SFC program stopped are cleared, and the program is started with the initial step of block 0.<br>OFF: Started with the step of the block being executed when the program stopped.<br>• Once turned on, the program is latched in the system and remains on even if the power is turned off.<br>Should be turned off by the sequence program when turning on the power, or when starting with the initial step of block 0. | |
| M9103 | SM1103 | SM323 | Presence/absence of continuous transition | OFF: Continuous transition not effective<br>ON : Continuous transition effective | • Selects consecutive or step-by-step transfer of steps of which transfer conditions are established when all of the transfer conditions of consecutive steps are established.<br>ON: Consecutive transfer is executed.<br>OFF: One step per one scan is transferred. | |

Special Relay List (Continued)

<table>
<tr><th>ACPU Special Relay</th><th>Special Relay after Conversion</th><th>Special Relay for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Applicable CPU</th></tr>
<tr><td>M9104</td><td>SM1104</td><td>SM324</td><td>Continuous transition suspension flag</td><td>OFF: When transition is completed<br>ON : When no transition</td><td>• Set when consecutive transfer is not executed with consecutive transfer enabled. Reset when transfer of one step is completed.<br>Consecutive transfer of a step can be prevented by writing an AND condition to corresponding M9104.</td><td rowspan="15">○</td></tr>
<tr><td>M9108</td><td>SM1108</td><td>SM90</td><td>Step transition watchdog timer start (equivalent of D9108)</td><td rowspan="8">OFF: Watchdog timer reset<br>ON : Watchdog timer reset start</td><td rowspan="8">• Turned on when the step transfer monitoring timer is started. Turned off when the monitoring timer is reset.</td></tr>
<tr><td>M9109</td><td>SM1109</td><td>SM91</td><td>Step transition watchdog timer start (equivalent of D9109)</td></tr>
<tr><td>M9110</td><td>SM1110</td><td>SM92</td><td>Step transition watchdog timer start (equivalent of D9110)</td></tr>
<tr><td>M9111</td><td>SM1111</td><td>SM93</td><td>Step transition watchdog timer start (equivalent of D9111)</td></tr>
<tr><td>M9112</td><td>SM1112</td><td>SM94</td><td>Step transition watchdog timer start (equivalent of D9112)</td></tr>
<tr><td>M9113</td><td>SM1113</td><td>SM95</td><td>Step transition watchdog timer start (equivalent of D9113)</td></tr>
<tr><td>M9114</td><td>SM1114</td><td>SM96</td><td>Step transition watchdog timer start (equivalent of D9114)</td></tr>
<tr><td>M9180</td><td>SM1180</td><td>SM825</td><td>Active step sampling trace completion flag</td><td>OFF: Trace started<br>ON : Trace completed</td><td>• Set when sampling trace of all specified blocks is completed. Reset when sampling trace is started.</td></tr>
<tr><td>M9181</td><td>SM1181</td><td>SM822</td><td>Active step sampling trace execution flag</td><td>OFF: Trace not being executed<br>ON : Trace execution under way</td><td>• Set when sampling trace is being executed.<br>Reset when sampling trace is completed or suspended.</td></tr>
<tr><td>M9182</td><td>SM1182</td><td>SM821</td><td>Active step sampling trace permission</td><td>OFF: Trace disable/suspend<br>ON : Trace enable</td><td>• Selects sampling trace execution enable/disable.<br>ON: Sampling trace execution is enabled.<br>OFF: Sampling trace execution is disabled.<br>If turned off during sampling trace execution, trace is suspended.</td></tr>
<tr><td>M9196</td><td>SM1196</td><td>SM325</td><td>Operation output at block stop</td><td>OFF: Coil output OFF<br>ON : Coil output ON</td><td>• Selects the operation output when block stop is executed.<br>ON: Retains the ON/OFF status of the coil being used by using operation output of the step being executed at block stop.<br>OFF: All coil outputs are turned off. (Operation output by the SET instruction is retained regardless of the ON/OFF status of M9196.)</td></tr>
<tr><td rowspan="5">M9197<br>M9198</td><td rowspan="5">SM1197<br>SM1198</td><td rowspan="5"></td><td rowspan="5">Switch between blown fuse and I/O verification error display</td><td>SM9197 / SM1198 / I/O numbers to be displayed</td><td rowspan="5">Switches I/O numbers in the fuse blow module storage registers (SD1100 to SD1107) and I/O module verify error storage registers (SD1116 to SD1123) according to the combination of ON/OFF of the SM1197 and SM1198.</td></tr>
<tr><td>OFF / OFF / X/Y 0 to 7F0</td></tr>
<tr><td>ON / OFF / X/Y 800 to FF0</td></tr>
<tr><td>OFF / ON / X/Y 1000 to 17F0</td></tr>
<tr><td>ON / ON / X/Y 1800 to 1FF0</td></tr>
<tr><td>M9199</td><td>SM1199</td><td></td><td>Data recovery of online sampling trace/status latch</td><td>OFF: Data recovery disabled<br>ON : Data recovery enabled</td><td>• Recovers the setting data stored in the CPU at restart when sampling trace/status latch is executed.<br>• SM1199 should be ON to execute again. (Unnecessary when writing the data again from peripheral devices.)</td></tr>
</table>

Special Relay List (Continued)

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9200 | SM1200 | — | ZNRD instruction (LRDP instruction for ACPU) reception (for master station) | OFF: Not accepted<br>ON : Accepted | • Depends on whether or not the ZNRD (word device read) instruction has been received.<br>• Used in the program as an interlock for the ZNRD instruction.<br>• Use the RST instruction to reset. | QnA |
| M9201 | SM1201 | — | ZNRD instruction (LRDP instruction for ACPU) completion (for master station) | OFF: Not completed<br>ON : End | • Depends on whether or not the ZNRD (word device read) instruction execution is complete.<br>• Used as a condition contact for resetting M9200 and M9201 after the ZNRD instruction is complete.<br>• Use the RST instruction to reset. | |
| M9202 | SM1202 | — | ZNWR instruction (LWTP instruction for ACPU) reception (for master station) | OFF: Not accepted<br>ON : Accepted | • Depends on whether or not the ZNWR (word device write) instruction has been received.<br>• Used in the program as an interlock for the ZNWR instruction.<br>• Use the RST instruction to reset. | |
| M9203 | SM1203 | — | ZNWR instruction (LWTP instruction for ACPU) completion (for master station) | OFF: Not completed<br>ON : End | • Depends on whether or not the ZNWR (word device write) instruction execution is complete.<br>• Used as a condition contact to reset M9202 and M9203 after the ZNWR instruction is complete.<br>• Use the RST instruction to reset. | |
| M9204 | SM1204 | — | ZNRD instruction (LWTP instruction for ACPU) reception (for local station) | OFF: Not completed<br>ON : End | On indicates that the ZNRD instruction is complete at the local station. | |
| M9205 | SM1205 | — | ZNWR instruction (LRDP instruction for ACPU) recep-tion (for local station) | OFF: Not completed<br>ON : End | On indicates that the ZNWR instruction is complete at the local station. | |
| M9206 | SM1206 | — | Host station link parameter error | OFF: Normal<br>ON : Abnormal | Depends on whether or not the link parameter setting of the host is valid. | |
| M9207 | SM1207 | — | Link parameter check results | OFF: YES<br>ON : NO | Depends on whether or not the link parameter setting of the master station in tier two matches that of the master station in tier three in a three-tier system.<br>(Valid only for the master stations in a three-tier system.) | |
| M9208 | SM1208 | — | Sets master station B and W transmission range (for lower link master stations only) | OFF: Transmits to tier2 and tier 3<br>ON : Transmits to tier2 only | • Depends on whether or not the B and W data controlled by higher-link master station (host station) is sent to lower-link local stations (tertiary stations).<br>• When SM1208 is OFF.....B and W of host station is sent to tertiary stations.<br>• When SM1208 is ON.....B and W of host station is not sent to tertiary stations. | |
| M9209 | SM1209 | — | Link parameter check command (for lower link master stations only) | OFF: Executing the check function<br>ON : Check non-execution | • Set to ON not to match B and W of the higher and lower links. (When SM1209 is ON, the link parameters of the higher and lower links are not checked.)<br>• When SM1209 is OFF, the link parameters of the higher and lower links are checked. | |
| M9210 | SM1210 | — | Link card error (for master station) | OFF: Normal<br>ON : Abnormal | Depends on presence or absence of the link card hardware error. Judged by the CPU. | |
| M9211 | SM1211 | — | Link module error (for local station use) | OFF: Normal<br>ON : Abnormal | Depends on presence or absence of the link card hardware error. Judged by the CPU. | |
| M9224 | SM1224 | — | Link status | OFF: Online<br>ON : Offline,station-to-station test, or self-loopback test | Depends on whether the master station is online or offline or is in station-to-station test or self-loopback test mode. | |
| M9225 | SM1225 | — | Forward loop error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of the forward loop line. | |
| M9226 | SM1226 | — | Reverse loop error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of the reverse loop line. | |
| M9227 | SM1227 | — | Loop test status | OFF: Not being executed<br>ON : Forward or reverse loop test execution underway | Depends on whether or not the master station is executing a forward or a reverse loop test. | |
| M9232 | SM1232 | — | Local station operation status | OFF: RUN or STEP RUN status<br>ON : STOP or PAUSE status | Depends on whether or not a local station is in STOP or PAUSE mode. | |

Special Relay List (Continued)

| ACPU Special Relay | Special Relay after Conversion | Special Relay for Modification | Name | Meaning | Details | Applicable CPU |
|---|---|---|---|---|---|---|
| M9233 | SM1233 | — | Local station error detect status | OFF: No errors<br>ON : Error detection | Depends on whether or not a local station has detected an error in another station. | QnA |
| M9235 | SM1235 | — | Local station, remote I/O station parameter error detect status | OFF: No errors<br>ON : Error detection | Depends on whether or not a local or a remote I/O station has detected any link parameter error in the master station | |
| M9236 | SM1236 | — | Local station, remote I/O station initial communications status | OFF: No communications<br>ON : Communications underway | Depends on the results of initial communication between a local or remote I/O station and the master station. (Parameter communication, etc.) | |
| M9237 | SM1237 | — | Local station, remote I/O station error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of a local or remote I/O station. | |
| M9238 | SM1238 | — | Local station, remote I/O station forward or reverse loop error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of the forward and reverse loop lines of a local or a remote I/O station. | |
| M9240 | SM1240 | — | Link status | OFF: Online<br>ON : Offline, station-to-stationtest, or self-loopback test | Depends on whether the local station is online or offline, or is in station-to-station test or self-loopback test mode. | |
| M9241 | SM1241 | — | Forward loop line error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of the forward loop line. | |
| M9242 | SM1242 | — | Reverse loop line error | OFF: Normal<br>ON : Abnormal | Depends on the error condition of the reverse loop line. | |
| M9243 | SM1243 | — | Loopback implementation | OFF: Loopback not being conducted<br>ON : Loopback implementation | Depends on whether or not loopback is occurring at the local station. | |
| M9246 | SM1246 | — | Data not received | OFF: Reception<br>ON : No reception | Depends on whether or not data has been received from the master station. | |
| M9247 | SM1247 | — | Data not received | OFF: Reception<br>ON : No reception | Depends on whether or not a tier three station has received data from its master station in a three-tier system. | |
| M9250 | SM1250 | — | Parameters not received | OFF: Reception<br>ON : No reception | Depends on whether or not link parameters have been received from the master station. | |
| M9251 | SM1251 | — | Link relay | OFF: Normal<br>ON : Abnormal | Depands on the data link condition at the local station. | |
| M9252 | SM1252 | — | Loop test status | OFF: Not being executed<br>ON : Forward or reverse loop test execution underway | Depends on whether or not the local station is executing a forward or a reverse loop test. | |
| M9253 | SM1253 | — | Master station operation status | OFF: RUN or STEP RUN status<br>ON : STOP or PAUSE status | Depends on whether or not the master station is in STOP or PAUSE mode. | |
| M9254 | SM1254 | — | Local station other than host station operation status | OFF: RUN or STEP RUN status<br>ON : STOP or PAUSE status | Depends on whether or not a local station other than the host is in STOP or PAUSE mode. | |
| M9255 | SM1255 | — | Local station other than host station error | OFF: Normal<br>ON : Abnormal | Depends on whether or not a local station other than the host is in error. | |

(10) Process control instructions

| Number | Name | Meaning | Explanation | Set by (When Set) | ACPU M9□□□ | Applicable CPU |
|---|---|---|---|---|---|---|
| SM1500 | Hold mode | OFF: No-hold<br>ON : Hold | • Specifies whether or not to hold the output value when a range over occurs for the S.IN instruction range check. | U | New | ○ |
| SM1501 | Hold mode | OFF: No-hold<br>ON : Hold | • Specifies whether or not the output value is held when a range over occurs for the S.OUT instruction range check. | U | New | |

## 11.7 Special Register List

The special registers, SD, are internal registers with fixed applications in the PLC.
For this reason, it is not possible to use these registers in sequence programs in the same way that normal registers are used.
However, data can be written as needed in order to control the CPU modules and remote I/O modules.
Data stored in the special registers are stored as BIN values if no special designation has been made to the contrary.

The headings in the table that follows have the following meanings.

| Item | Function of Item |
|---|---|
| Number | • Indicates special register number |
| Name | • Indicates name of special register |
| Meaning | • Indicates contents of special register |
| Explanation | • Discusses contents of special register in more detail |
| Set by (When set) | • Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed.<br><Set by><br>S : Set by system<br>U : Set by user (sequence programs or test operations from GX Developer)<br>S/U : Set by both system and user<br><When set> → Indicated only for registers set by system<br>Each END : Set during each END processing<br>Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN)<br>Status change : Set only when there is a change in status<br>Error : Set when error occurs<br>Instruction execution : Set when instruction is executed<br>Request : Set only when there is a user request (through SM, etc.) |
| Corresponding ACPU<br>M9□□□ | • Indicates corresponding special register in ACPU (D9□□□)(Change and notation when there has been a change in contents)<br>• Items indicated as "New" have been newly added for Process CPU |
| Corresponding CPU | • Indicates the corresponding CPU type name.<br>○+Rem: Can be applied to Process CPU and MELSECNET/H remote I/O modules.<br>○: Can be applied to all types of CPU<br>Remote: Can be applied to the MELSECNET/H remote I/O modules. |

For details on the following items, see these manuals:

- Networks → • For Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)
  • For Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network)
- SFC → QCPU(Q mode)/QnACPU Programming Manual (SFC)

## Special Register List

### (1) Diagnostic Information

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD0 | Diagnostic errors | Diagnosis error code | • Error codes for errors found by diagnosis are stored as BIN data.<br>• Contents identical to latest fault history information. | S (Error) | D9008 format change | ○+Rem |
| SD1 | Clock time for diagnosis error occurrence | Clock time for diagnosis error occurrence | • Year (last two digits) and month that SD0 data was updated is stored as BCD 2-digit code.<br>B15 to B8 B7 to B0<br>Year (0 to 99) \| Month (1 to 12)<br>(Example)<br>: October, 1995<br>H9510 | S (Error) | New | |
| SD2 | | | • The day and hour that SD0 was updated is stored as BCD 2-digit code.<br>B15 to B8 B7 to B0<br>Day (1 to 31) \| Hour (0 to 23)<br>(Example)<br>: 10 p.m. on 25th<br>H2510 | | | |
| SD3 | | | • The minute and second that SD0 data was updated is stored as BCD 2-digit code.<br>B15 to B8 B7 to B0<br>Minutes (0 to 59) \| Seconds (0 to 59)<br>(Example)<br>: 35 min. 48 sec. (past the hour)<br>H3548 | | | |
| SD4 | Error information categories | Error information category code | • Category codes which help indicate what type of information is being stored in the common information areas (SD5 through SD15) and the individual information areas (SD16 through SD26) are stored here.<br>B15 to B8 B7 to B0<br>Individual information category codes \| Common information category codes<br>• The common information category codes store the following codes:<br>0 : No error<br>1 : Unit/module No./ PLC No./Base No. ✻<br>2 : File name/Drive name<br>3 : Time (value set)<br>4 : Program error location<br>5 : Switch cause (for Q4AR only)<br>✻ : For a multiple PLC system, the module number or PLC number is stored depending on the error that occurred. (Refer to the corresponding error code for which number has been stored.)<br>PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4<br>• The individual information category codes store the following codes:<br>0 : No error<br>1 : (Open)<br>2 : File name/Drive name<br>3 : Time (value actually measured)<br>4 : Program error location<br>5 : Parameter number<br>6 : Annunciator number<br>7 : Check instruction malfunction number | S (Error) | New | |

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD5<br>SD6<br>SD7<br>SD8<br>SD9<br>SD10<br>SD11<br>SD12<br>SD13<br>SD14<br>SD15</td><td>Error common information</td><td>Error common information</td><td>
• Common information corresponding to the error codes (SD0) is stored here.<br>
• The following four types of information are stored here:<br>
① Slot No.
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD5</td><td>Slot No./PLC No./Base No. ＊1＊2</td></tr>
<tr><td>SD6</td><td>I/O No.</td></tr>
<tr><td>SD7<br>SD8<br>SD9<br>SD10<br>SD11<br>SD12<br>SD13<br>SD14<br>SD15</td><td>(Vacant)</td></tr>
</table>
(Not used for base No.)<br>
*1: For a multiple PLC system, the slot number or PLC number is stored depending on the error that occurred.<br>
Slot 0 in the multiple PLC system is the one on the slot on the right of the rightmost CPU module.<br>
(Refer to the corresponding error code for which number has been stored.)<br>
PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4<br>
*2: If a fuse blown or I/O verify error occurred in the module loaded in the MELSECNET/H remote I/O station, the network number is stored into the upper 8 bits and the station number into the lower 8 bits.<br>
Use the I/O No. to check the module where the fuse blown or I/O verify error occurred.<br>
② File name/Drive name
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD5</td><td colspan="2">Drive</td></tr>
<tr><td>SD6<br>SD7<br>SD8<br>SD9</td><td colspan="2">File name<br>(ASCII code: 8 characters)</td></tr>
<tr><td>SD10</td><td>Extension＊3</td><td>2EH(.)</td></tr>
<tr><td>SD11</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD12<br>SD13<br>SD14<br>SD15</td><td colspan="2">(Vacant)</td></tr>
</table>
(Example)<br>
File name= ABCDEFGH. IJK
<table>
<tr><th>B15 to B8</th><th>B7 to B0</th></tr>
<tr><td>42H(B)</td><td>41H(A)</td></tr>
<tr><td>44H(D)</td><td>43H(C)</td></tr>
<tr><td>46H(F)</td><td>45H(E)</td></tr>
<tr><td>48H(H)</td><td>47H(G)</td></tr>
<tr><td>49H(I)</td><td>2EH(.)</td></tr>
<tr><td>4BH(K)</td><td>4AH(J)</td></tr>
</table>
</td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

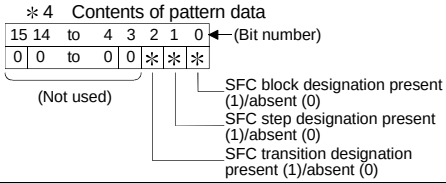
＊3: Refer to REMARK.

REMARK

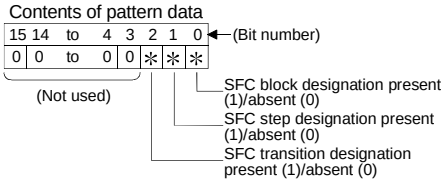
1) Extensions are shown below.

| SD10 | SD11 | | Extension name | File type |
|---|---|---|---|---|
| Higher8 bits | Lower8 bits | Higher8 bits | | |
| 51H | 50H | 41H | QPA | Parameters |
| 51H | 50H | 47H | QPG | Sequence program/SFC program |
| 51H | 43H | 44H | QCD | Device comment |
| 51H | 44H | 49H | QDI | Device initial value |
| 51H | 44H | 52H | QDR | File register |
| 51H | 44H | 53H | QDS | Simulation data |
| 51H | 44H | 4CH | QDL | Local device |
| 51H | 46H | 44H | QFD | Trouble history data |

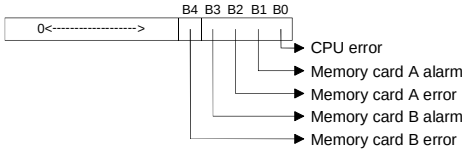
Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD5<br>SD6<br>SD7<br>SD8<br>SD9<br>SD10<br>SD11<br>SD12<br>SD13<br>SD14<br>SD15</td><td>Error common information</td><td>Error common information</td><td>③ Time (value set)<br><table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5</td><td>Time : 1 μs units (0 to 999 μs)</td></tr><tr><td>SD6</td><td>Time : 1 ms units (0 to 65535 ms)</td></tr><tr><td>SD7<br>SD8<br>SD9<br>SD10<br>SD11<br>SD12<br>SD13<br>SD14<br>SD15</td><td>(Vacant)</td></tr></table>④ Program error location<br><table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5<br>SD6<br>SD7<br>SD8</td><td>File name<br>(ASCII code: 8 characters)</td></tr><tr><td>SD9</td><td>Extension 2EH(.)</td></tr><tr><td>SD10</td><td>(ASCII code: 3 characters)</td></tr><tr><td>SD11</td><td>Pattern ∗4</td></tr><tr><td>SD12</td><td>Block No.</td></tr><tr><td>SD13</td><td>Step No./transition No.</td></tr><tr><td>SD14</td><td>Sequence step No. (L)</td></tr><tr><td>SD15</td><td>Sequence step No. (H)</td></tr></table>∗4 Contents of pattern data<br>  </td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD16<br>SD17<br>SD18<br>SD19<br>SD20<br>SD21<br>SD22<br>SD23<br>SD24<br>SD25<br>SD26</td><td>Error individual information</td><td>Error individual information</td><td>
• Individual information corresponding to error codes (SD0) is stored here.<br>
① File name/Drive name<br>
(Example)<br>
File name= ABCDEFGH. IJK<br>
B15 to B8 B7 to B0<br>
42H(B) 41H(A)<br>
44H(D) 43H(C)<br>
46H(F) 45H(E)<br>
48H(H) 47H(G)<br>
49H(I) 2EH(.)<br>
4BH(K) 4AH(J)<br>
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD16</td><td colspan="2">Drive</td></tr>
<tr><td>SD17</td><td colspan="2" rowspan="5">File name<br>(ASCII code: 8 characters)</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td><td>Extension</td><td>2EH(.)</td></tr>
<tr><td>SD22</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD23</td><td colspan="2" rowspan="4">(Vacant)</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
② Time (value actu1ally measured)<br>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>Time : 1 μs units (0 to 999 μs)</td></tr>
<tr><td>SD17</td><td>Time : 1 ms units (0 to 65535 ms)</td></tr>
<tr><td>SD18</td><td rowspan="9">(Vacant)</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
③ Program error location<br>
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD16</td><td colspan="2" rowspan="4">File name<br>(ASCII code: 8 characters)</td></tr>
<tr><td>SD17</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td><td>Extension</td><td>2EH(.)</td></tr>
<tr><td>SD21</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD22</td><td colspan="2">Pattern∗</td></tr>
<tr><td>SD23</td><td colspan="2">Block No.</td></tr>
<tr><td>SD24</td><td colspan="2">Step No./transition No.</td></tr>
<tr><td>SD25</td><td colspan="2">Sequence step No. (L)</td></tr>
<tr><td>SD26</td><td colspan="2">Sequence step No. (H)</td></tr>
</table>
∗ Contents of pattern data<br>

15 14 to 4 3 2 1 0
(Bit number)
0 0 to 0 0 ∗ ∗ ∗
(Not used)
SFC block designation present (1)/absent (0)
SFC step designation present (1)/absent (0)
SFC transition designation present (1)/absent (0)
<br>
④ Parameter number<br>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>Parameter No.∗6</td></tr>
<tr><td>SD17</td><td rowspan="9">(Vacant)</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
⑤ Annunciator number / CHK instruction malfunction number<br>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>No.</td></tr>
<tr><td>SD17</td><td rowspan="9">(Vacant)</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
⑥ Intelligent function module parameter error (for QCPU only)<br>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>Parameter No. ∗6</td></tr>
<tr><td>SD17</td><td>Error code for intelligent function module</td></tr>
<tr><td>SD18</td><td rowspan="9">(Vacant)</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td></tr>
<tr><td>SD22</td></tr>
<tr><td>SD23</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
∗6 For details of the parameter numbers, refer to the user's manual of the CPU used.
</td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

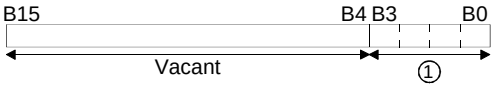
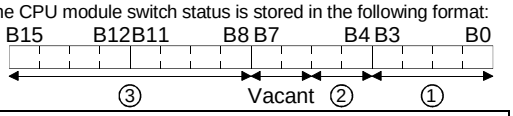
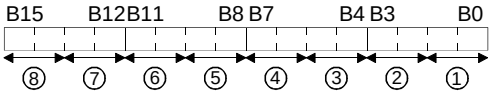
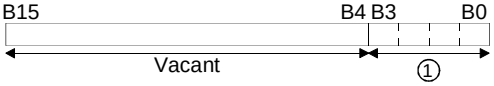
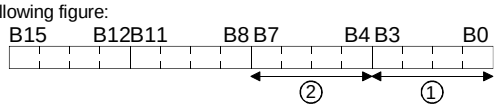
| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD50 | Error reset | Error number that performs error reset | • Stores error number that performs error reset | U | New | ○+Rem |
| SD51 | Battery low latch | Bit pattern indicating where battery voltage drop occurred | • All corresponding bits go ON when battery voltage drops.<br>• Subsequently, these remain ON even after battery voltage has been returned to normal.<br>  <br>• When High Performance model QCPU is used, this flag is always OFF because memory card B is used as standard memory. | S (Error) | New | ○ |
| SD52 | Battery low | Bit pattern indicating where battery voltage drop occurred | • Same configuration as SD51 above<br>• Subsequently, goes OFF when battery voltage is restored to normal.<br>• When QCPU is used, this flag is always OFF because memory card B is used as standard memory. | S (Error) | New | |
| SD53 | AC DOWN detection | Number of times for AC DOWN | • Every time the input voltage falls to or below 85% (AC power)/65% (DC power) of the rating during calculation of the CPU module, the value is incremented by 1 and stored in BIN code. | S (Error) | D9005 | ○+Rem |
| SD60 | Blown fuse number | Number of module with blown fuse | • Value stored here is the lowest station I/O number of the module with the blown fuse. | S (Error) | D9000 | ○+Rem |
| SD61 | I/O module verification error number | I/O module verification error module number | • The lowest I/O number of the module where the I/O module verification number took place. | S (Error) | D9002 | |
| SD62 | Annunciator number | Annunciator number | • The first annunciator number to be detected is stored here. | S (Instruction execution) | D9009 | ○ |
| SD63 | Number of annunciators | Number of annunciators | • Stores the number of annunciators searched. | S (Instruction execution) | D9124 | |

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD64</td><td rowspan="16">Table of detected annunciator numbers</td><td rowspan="16">Annunciator detection number</td><td rowspan="16">When F goes ON due to OUT F or SET F, the F numbers which go progressively ON from SD64 through SD79 are registered.<br>F numbers turned OFF by RST F are deleted from SD64 to SD79, and are shifted to the data register following the data register where the deleted F numbers had been stored.<br>Execution of the LEDR instruction shifts the contents of SD64 to SD79 up by one.<br>(This can also be done by using the INDICATOR RESET switch on the front of the Q3A/Q4ACPU.)<br>After 16 annunciators have been detected, detection of the 17th will not be stored from SD64 through SD79.<br>SET SET SET RST SET SET SET SET SET SET SET SET<br>F50 F25 F99 F25 F15 F70 F65 F38 F110 F151 F210 LEDR<br>SD62 0 50 50 50 50 50 50 50 50 50 50 50 99 ...(Number detected)<br>SD63 0 1 2 3 2 3 4 5 6 7 8 9 8 ...(Number of annunciators detected)<br>SD64 0 50 50 50 50 50 50 50 50 50 50 50 99<br>SD65 0 0 25 25 99 99 99 99 99 99 99 99 15<br>SD66 0 0 0 99 0 15 15 15 15 15 15 15 70<br>SD67 0 0 0 0 0 0 70 70 70 70 70 70 65<br>SD68 0 0 0 0 0 0 0 65 65 65 65 65 38<br>SD69 0 0 0 0 0 0 0 0 38 38 38 38 110<br>SD70 0 0 0 0 0 0 0 0 0 110 110 110 151<br>SD71 0 0 0 0 0 0 0 0 0 0 151 151 210<br>SD72 0 0 0 0 0 0 0 0 0 0 0 210 0 (Number detected)<br>SD73 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD74 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD75 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD76 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD77 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD78 0 0 0 0 0 0 0 0 0 0 0 0 0<br>SD79 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td rowspan="16">S (Instruction execution)</td><td>D9125</td><td rowspan="26">○</td></tr>
<tr><td>SD65</td><td>D9126</td></tr>
<tr><td>SD66</td><td>D9127</td></tr>
<tr><td>SD67</td><td>D9128</td></tr>
<tr><td>SD68</td><td>D9129</td></tr>
<tr><td>SD69</td><td>D9130</td></tr>
<tr><td>SD70</td><td>D9131</td></tr>
<tr><td>SD71</td><td>D9132</td></tr>
<tr><td>SD72</td><td>New</td></tr>
<tr><td>SD73</td><td>New</td></tr>
<tr><td>SD74</td><td>New</td></tr>
<tr><td>SD75</td><td>New</td></tr>
<tr><td>SD76</td><td>New</td></tr>
<tr><td>SD77</td><td>New</td></tr>
<tr><td>SD78</td><td>New</td></tr>
<tr><td>SD79</td><td>New</td></tr>
<tr><td>SD80</td><td>CHK number</td><td>CHK number</td><td colspan="2">• Error codes detected by the CHK instruction are stored as BCD code.</td><td>S (Instruction execution)</td><td>New</td></tr>
<tr><td>SD90</td><td rowspan="10">Step transition watchdog timer setting value (Enabled only when SFC program exists)</td><td rowspan="10">F number for timer set value and time over error</td><td>Corresponds to SM90</td><td rowspan="10">• F numbers which go ON at step transition watchdog timer set value and watchdog timer over errors.<br>B15 B8 B7 B0<br>F number setting (0 to 255) Timer time limit setting (1 to 255 sec: (1-second units))<br>• Timer is started by turning SM90 through SM99 ON during active step, and if the transition conditions for the relevant steps are not met within the timer limits, the designated annunciator (F) will go ON.</td><td rowspan="10">U</td><td>D9108</td></tr>
<tr><td>SD91</td><td>Corresponds to SM91</td><td>D9109</td></tr>
<tr><td>SD92</td><td>Corresponds to SM92</td><td>D9110</td></tr>
<tr><td>SD93</td><td>Corresponds to SM93</td><td>D9111</td></tr>
<tr><td>SD94</td><td>Corresponds to SM94</td><td>D9112</td></tr>
<tr><td>SD95</td><td>Corresponds to SM95</td><td>D9113</td></tr>
<tr><td>SD96</td><td>Corresponds to SM96</td><td>D9114</td></tr>
<tr><td>SD97</td><td>Corresponds to SM97</td><td>New</td></tr>
<tr><td>SD98</td><td>Corresponds to SM98</td><td>New</td></tr>
<tr><td>SD99</td><td>Corresponds to SM99</td><td>New</td></tr>
<tr><td>SD105</td><td>CH1 transmission speed setting (RS232)</td><td>Stores the preset transmission speed when GX Developer is used.</td><td colspan="2">3 : 300bps, 6 : 600bps, 24 : 2400bps, 48 : 4800bps<br>96 : 9600bps, 192 : 19.2kbps, 384 : 38.4kbps<br>576 : 57.6kbps, 1152 : 115.2kbps</td><td>S</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List

(2) System information

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD200 | Status of switch | Status of CPU switch | • The switch status of the remote I/O module is stored in the following format.<br>  <br><br>① Remote I/O module switch status Always 1: STOP | S (Always) | New | Remote |
| | | | • The CPU module switch status is stored in the following format:<br>  <br><br>①: CPU switch status 0: RUN 1: STOP 2: L.CLR<br>②: Memory card switch Always OFF<br>③: DIP switch B8 through BC correspond to SW1 through SW5 of system setting switch 1. 0: OFF, 1: ON BD through BF are vacant. | S(Every END processing) | New | ○ |
| SD201 | LED status | Status of CPU-LED | • The following bit patterns are used to store the statuses of the LEDs on the CPU:<br>  <br><br>①: RUN ⑤: BOOT<br>②: ERROR ⑥: Vacant<br>③: USER ⑦: Vacant<br>④: BAT.ALARM ⑧: MODE<br>Bit patterns for MODE 0: OFF, 1: Green, 2: Orange | S (Status change) | New | QCPU |
| SD203 | Operating status of CPU | Operating status of CPU | • The operating status of the remote I/O module is stored in the following format.<br>  <br><br>① Remote I/O module operating status Always 2: STOP | S (Always) | New | Rem |
| | | | • The CPU module operating status is stored as indicated in the following figure:<br>  <br><br>①: Operating status of CPU 0 :RUN 1 :STEP-RUN 2 :STOP 3 :PAUSE<br>②: STOP/PAUSE cause 0 :Switch 1 :Remote contact 2 : Remote operation from the GX Developer or Serial Communication. 3 :Internal program instruction 4 :Errors<br>Note: Priority is earliest first | S (Every END processing) | D9015 format change | ○ |

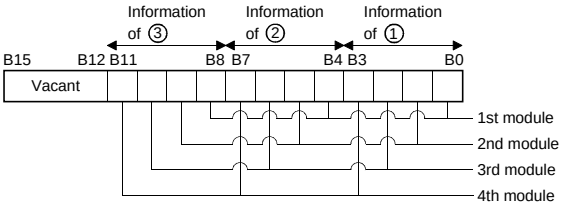
Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by<br>(When set)</th><th>Corresponding<br>ACPU<br>D9□□□</th><th>Corresponding<br>CPU</th></tr>
<tr><td>SD206</td><td>Device test execution type</td><td>0: Test not yet executed<br>1: During X device test<br>2: During Y device test<br>3: During X/Y device test</td><td>• Set when the device test mode is executed on GX Developer.</td><td>S<br>(Request)</td><td>New</td><td>Rem</td></tr>
<tr><td>SD207</td><td rowspan="3">LED display priority ranking</td><td>Priorities 1 to 4</td><td rowspan="3">• When error is generated, the LED display (flicker) is made according to the error number setting priorities.<br>• The setting areas for priorities are as follows:<br>B15 B12 B11 B8 B7 B4 B3 B0<br>SD207 Priority 4 | Priority 3 | Priority 2 | Priority 1<br>SD208 Priority 8 | Priority 7 | Priority 6 | Priority 5<br>SD209 Priority 10 | Priority 9<br>Default Value SD207=H4321<br>SD208=H8765<br>SD207=H00A9<br>• No display is made if "0" is set.<br>However, even if "0" has been set, information concerning CPU operation stop (including parameter settings) errors will be indicated by the LEDs without conditions.<br>See Section 7.9.5 REMARK for the priority order.</td><td rowspan="3">U</td><td>D9038</td><td rowspan="3">○</td></tr>
<tr><td>SD208</td><td>Priorities 5 to 8</td><td>D3039 format change</td></tr>
<tr><td>SD209</td><td>Priorities 9 to 10</td><td>New</td></tr>
<tr><td>SD210</td><td>Clock data</td><td>Clock data (year, month)</td><td>• The year (last two digits) and month are stored as BCD code at SD210 as shown below:<br>B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example :<br>July 1993<br>H9307<br>Year Month</td><td rowspan="3">S/U<br>(Request)</td><td>D9025</td><td rowspan="3">○+Rem</td></tr>
<tr><td>SD211</td><td>Clock data</td><td>Clock data (day, hour)</td><td>• The day and hour are stored as BCD code at SD211 as shown below:<br>B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example :<br>31st, 10 a.m.<br>H3110<br>Day Hour</td><td>D9026</td></tr>
<tr><td>SD212</td><td>Clock data</td><td>Clock data (minute, second)</td><td>• The minutes and seconds (after the hour) are stored as BCD code at SD212 as shown below:<br>B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example :<br>35 min., 48 sec.<br>(after the hour)<br>H3548<br>Minute Second</td><td>D9027</td></tr>
<tr><td>SD213</td><td>Clock data</td><td>Clock data (day of week)</td><td>• Stores the year (two digits) and the day of the week in SD213 in the BCD code format as shown below.<br>B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example :<br>Friday<br>H0005<br>Higher digits of year (0 to 99)<br>Day of week<br>0 Sunday<br>1 Monday<br>2 Tuesday<br>3 Wednesday<br>4 Thursday<br>5 Friday<br>6 Saturday</td><td>S/U<br>(Request)</td><td>D9028</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD220<br>SD221<br>SD222<br>SD223<br>SD224<br>SD225<br>SD226<br>SD227</td><td>LED display data</td><td>Display indicator data</td><td>• LED display ASCII data (16 characters) stored here.<br>B15 to B8 B7 to B0<br>SD220: 15th character from the right | 16th character from the right<br>SD221: 13th character from the right | 14th character from the right<br>SD222: 11th character from the right | 12th character from the right<br>SD223: 9th character from the right | 10th character from the right<br>SD224: 7th character from the right | 8th character from the right<br>SD225: 5th character from the right | 6th character from the right<br>SD226: 3rd character from the right | 4th character from the right<br>SD227: 1st character from the right | 2nd character from the right</td><td>S (When changed)</td><td>New</td><td>○</td></tr>
<tr><td>SD235</td><td>Unit to which Online module change is being performed</td><td>The header I/O number of the unit to which Online module cxchange is being performed + 10H</td><td>• 10H is added to the value of the header I/O number of which the Online module change is being performed.</td><td>S(During Online module Exchange)</td><td>New</td><td></td></tr>
<tr><td>SD240</td><td>Base mode</td><td>0: Automatic mode<br>1: Detail mode</td><td>• Stores the base mode.</td><td>S (Initial)</td><td>New</td><td rowspan="5">○+Rem</td></tr>
<tr><td>SD241</td><td>No. of extension bases</td><td>0: Main base only<br>1 to 7: No. of extension bases</td><td>• Stores the maximum number of the extension bases being installed.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD242</td><td>A/Q base differentiation</td><td>Base type differentiation<br>0: QA✻✻B is installed (A mode)<br>1: Q✻✻B is installed (Q mode)</td><td>B7 B2 B1 B0<br>Fixed to 0 | | to | | | |<br>Main base<br>1st expansion base<br>2nd expansion base<br>to<br>7th expansion base<br>When no expansion base is installed, the value is fixed to 0.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD243<br>SD244</td><td>No. of base slots</td><td>No. of base slots</td><td>B15 B12 B11 B8 B7 B4 B3 B0<br>SD243: Expansion 3 | Expansion 2 | Expansion 1 | Main<br>SD244: Expansion 7 | Expansion 6 | Expansion 5 | Expansion 4<br>• As shown above, each area stores the number of slots being installed.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD250</td><td>Loaded maximum I/O</td><td>Loaded maximum I/O No.</td><td>• When SM250 goes from OFF to ON, the upper 2 digits of the final I/O number plus 1 of the modules loaded are stored as BIN values.</td><td>S (Request END)</td><td>New</td><td>○+Rem</td></tr>
<tr><td>SD254</td><td rowspan="10">MELSECNET/10 (H) information</td><td colspan="2">Number of modules installed</td><td>• Indicates the number of modules installed on MELSECNET/10 (H)</td><td rowspan="10">S (Initial)</td><td rowspan="10">New</td><td rowspan="10">○</td></tr>
<tr><td>SD255</td><td rowspan="5">Information from 1st module</td><td>I/O No.</td><td>• MELSECNET/10 (H) I/O number of first module installed</td></tr>
<tr><td>SD256</td><td>Network No.</td><td>• MELSECNET/10 (H) network number of first module installed</td></tr>
<tr><td>SD257</td><td>Group number</td><td>• MELSECNET/10 (H) group number of first module installed</td></tr>
<tr><td>SD258</td><td>Station No.</td><td>• MELSECNET/10 (H) station number of first module installed</td></tr>
<tr><td>SD259</td><td>Standby informa-tion</td><td>• In the case of standby stations, the module number of the standby station is stored. (1 to 4)</td></tr>
<tr><td>SD260 to SD264</td><td colspan="2">Information from 2nd module</td><td>• Configuration is identical to that for the 2nd module.</td></tr>
<tr><td>SD265 to SD269</td><td colspan="2">Information from 3rd module</td><td>• Configuration is identical to that for the 3rd module.</td></tr>
<tr><td>SD270 to SD274</td><td colspan="2">Information from 4th module</td><td>• Configuration is identical to that for the 4th module.</td></tr>
</table>

Special Register List (Continued)

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD280 | CC-Link error | Error detection status | ① When Xn0 of the installed CC-Link goes ON, the bit corresponding to the station switches ON.<br>② When either Xn1 or XnF of the installed CC-Link switch OFF, the bit corresponding to the station switches ON.<br>③ Switches ON when the CPU cannot communicate with the installed CC-Link.<br>  | S (Error) | New | QCPU Remote |
| SD290 | Device allocation (Same as parameter contents) | Number of points allocated for X | • Stores the number of points currently set for X devices | S (Initial) | New | ○+Rem |
| SD291 | | Number of points allocated for Y | • Stores the number of points currently set for Y devices | | | |
| SD292 | | Number of points allocated for M | • Stores the number of points currently set for M devices | | | |
| SD293 | | Number of points allocated for L | • Stores the number of points currently set for L devices | | | ○ |
| SD294 | | Number of points allocated for B | • Stores the number of points currently set for B devices | | | ○+Rem |
| SD295 | | Number of points allocated for F | • Stores the number of points currently set for F devices | | | ○ |
| SD296 | | Number of points allocated for SB | • Stores the number of points currently set for SB devices | | | ○+Rem |
| SD297 | | Number of points allocated for V | • Stores the number of points currently set for V devices | | | ○ |
| SD298 | | Number of points allocated for S | • Stores the number of points currently set for S devices | | | |
| SD299 | | Number of points allocated for T | • Stores the number of points currently set for T device | | | |
| SD300 | | Number of points allocated for ST | • Stores the number of points currently set for ST devices | | | |
| SD301 | | Number of points allocated for C | • Stores the number of points currently set for C devices | | | |
| SD302 | | Number of points allocated for D | • Stores the number of points currently set for D devices | S (Initial) | New | ○+Rem |
| SD303 | | Number of points allocated for W | • Stores the number of points currently set for W devices | | | |
| SD304 | | Number of points allocated for SW | • Stores the number of points currently set for SW devices | | | |
| SD315 | Time reserved for communication processing | Time reserved for communication processing | Reserves the designated time for communication processing with GX Developer or other units.<br>The greater the value is designated, the shorter the response time for communication with other devices (GX Developer, serial communication units) becomes.<br>The scan time becomes longer by the designated time. Setting range: 1 to 100 ms<br>If the designated value is out of the range above, it is assumed to no setting. | END processing | New | ○ |

Special Register List (Continued)

| Number | Name | Meaning | | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|---|
| SD340 | Ethernet information | No. of modules installed | | • Indicates the number of modules installed on Ethernet. | S (Initial) | New | ○+Rem |
| SD341 | | Information of 1st module | I/O No. | • Ethernet I/O No. of the 1st module installed. | | | |
| SD342 | | | Network No. | • Ethernet network No. of the 1st module installed. | | | |
| SD343 | | | Group No. | • Ethernet group No. of the 1st module installed. | | | |
| SD344 | | | Station No. | • Ethernet station No. of the 1st module installed. | | | |
| SD345 to SD346 | | | Empty | • Empty<br>(The Ethernet IP address of the 1st module is stored in buffer memory.) | | | |
| SD347 | | | Empty | • Empty<br>(The Ethernet error code of the 1st module is read with the ERRORRD instruction.) | | | |
| SD348 to SD354 | | Information from 2nd module | | • Configuration is identical to that for the first module. | S (Initial) | New | |
| SD355 to SD361 | | Information from 3rd module | | • Configuration is identical to that for the first module. | | | |
| SD362 to SD368 | | Information from 4th module | | • Configuration is identical to that for the first module. | | | |
| SD395 | Multiple PLC number | Multiple PLC number | | • In a multiple PLC system configuration, the PLC number of the host CPU is stored.<br>PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4 | S (Initial) | New | ○ |

(3) System clocks/counters

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD412 | 1 second counter | Number of counts in 1-second units | • Following programmable controller CPU module RUN, 1 is added each second<br>• Count repeats from 0 to 32767 to -32768 to 0 | S (Status change) | D9022 | ○ |
| SD414 | 2n second clock setting | 2n second clock units | • Stores value n of 2n second clock (Default is 30)<br>• Setting can be made between 1 and 32767 | U | New | |
| SD415 | 2nms clock setting | 2nms clock units | • Stores value n of 2nms clock (Default is 30)<br>• Setting can be made between 1 and 32767 | U | New | |
| SD420 | Scan counter | Number of counts in each scan | • This counter increases by 1 for each scan of the scan execution type program after RUN of the CPU module. ∗<br>• Count repeats from 0 to 32767 to -32768 to 0 | S(Every END processing) | New | |
| SD430 | Low speed scan counter | Number of counts in each scan | • This counter increases by 1 for each scan of the low speed execution type program after RUN of the CPU module.<br>• Count repeats from 0 to 32767 to -32768 to 0<br>• Used only for low speed execution type programs | S(Every END processing) | New | |

∗ : Not counted by the scan in an initial execution type program.

Special Register List

(4) Scan information

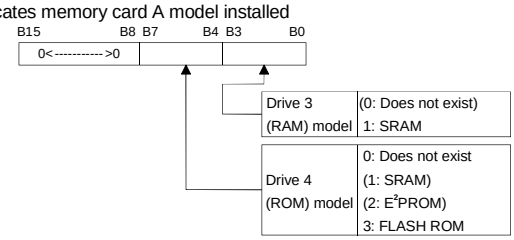
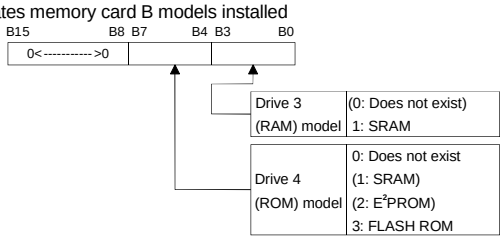
| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD500 | Execution program No. | Execution type of program being executed | • Program number of program currently being executed is stored as BIN value. | S (Status change) | New | |
| SD510 | Low speed program No. | File name of low speed execution in progress | • Program number of low speed program currently being executed is stored as BIN value.<br>• Enabled only when SM510 is ON. | S (Every END processing) | New | |
| SD520 | Current scan time | Current scan time (in 1 ms units) | • Stores current scan time (in 1 ms units)<br>Range from 0 to 65535 | S (Every END processing) | D9017 format change | |
| SD521 | | Current scan time (in 100 μs units) | • Stores current scan time (in 100 μs units)<br>Range from 00000 to 900<br>(Example)<br>A current scan of 23.6 ms would be stored as follows:<br>D520=23<br>D521=600 | S (Every END processing) | New | |
| SD522 | Initial scan time | Initial scan time (in 1 ms units) | • Stores scan time for initially execution type program. (in 1 ms units)<br>• Range from 0 to 65535 | S (First END processing) | New | |
| SD523 | | Initial scan time (in 100 μs units) | • Stores scan time for initially execution type program. (in 100 μs units)<br>• Range of 000 to 900 | | | |
| SD524 | Minimum scan time | Minimum scan time (in 1 ms units) | • Stores minimum value of scan time (in 1 ms units)<br>• Range from 0 to 65535 | S (Every END processing) | D9018 format change | |
| SD525 | | Minimum scan time (in 100 μs units) | • Stores minimum value of scan time (in 100 μs units)<br>• Range of 000 to 900 | S (Every END processing) | New | |
| SD526 | Maximum scan time | Maximum scan time (in 1 ms units) | • Stores maximum value of scan time, excepting the first scan. (in 1 ms units)<br>• Range from 0 to 65535 | S (Every END processing) | D9019 format change | ○ |
| SD527 | | Maximum scan time (in 100 μs units) | • Stores maximum value of scan time, excepting the first scan. (in 100 μs units)<br>• Range of 000 to 900 | | New | |
| SD528 | Current scan time for low speed execution type programs | Current scan time (in 1 ms units) | • Stores current scan time for low speed execution type program (in 1 ms units) | S (Every END processing) | New | |
| SD529 | | Current scan time (in 100 μs units) | • Stores current scan time for low speed execution type program (in 100 μs units)<br>• Range of 000 to 900 | | | |
| SD532 | Minimum scan time for low speed execution type programs | Minimum scan time (in 1 ms units) | • Stores minimum value of scan time for low speed execution type program (in 1 ms units)<br>• Range from 0 to 65535 | S (Every END processing) | New | |
| SD533 | | Minimum scan time (in 100 μs units) | • Stores minimum value of scan time for low speed execution type program (in 100 μs units)<br>• Range of 000 to 900 | | | |
| SD534 | Maximum scan time for low speed execution type programs | Maximum scan time (in 1 ms units) | • Stores the maximum scan time for all except low speed execution type program's first scan. (in 1 ms units)<br>• Range from 0 to 65535 | S (Every END processing) | New | |
| SD535 | | Maximum scan time (in 100 μs units) | • Stores the maximum scan time for all except low speed execution type program's first scan. (in 100 μs units)<br>• Range of 000 to 900 | | | |
| SD540 | END processing time | END processing time (in 1 ms units) | • Stores time from completion of scan program to start of next scan. (in 1 ms units)<br>• Range from 0 to 65535 | S (Every END processing) | New | |
| SD541 | | END processing time (in 100 μs units) | • Stores time from completion of scan program to start of next scan. (in 100 μs units)<br>• Range of 000 to 900 | | | |

Special Register List (Continued)

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD542 | Constant scan wait time | Constant scan wait time (in 1 ms units) | • Stores wait time when constant scan time has been set. (in 1 ms units)<br>• Range from 0 to 65535 | S (First END processing) | New | ○ |
| SD543 | | Constant scan wait time (in 100 μs units) | • Stores wait time when constant scan time has been set. (in 100 μs units)<br>• Range of 000 to 900 | | | |
| SD544 | Cumulative execution time for low speed execution type programs | Cumulative execution time for low speed execution type programs (in 1 ms units) | • Stores cumulative execution time for low speed execution type programs. (in 1 ms units)<br>• Range from 0 to 65535<br>• Cleared to 0 following 1 low speed scan | S (Every END processing) | New | |
| SD545 | | Cumulative execution time for low speed execution type programs (in 100 μs units) | • Stores cumulative execution time for low speed execution type programs. (in 100 μs units)<br>• Range of 000 to 900<br>• Cleared to 0 following 1 low speed scan | | | |
| SD546 | Execution time for low speed execution type programs | Execution time for low speed execution type programs (in 1 ms units) | • Stores low speed program execution time during 1 scan (in 1 ms units)<br>• Range from 0 to 65535<br>• Stores each scan | S (Every END processing) | New | |
| SD547 | | Execution time for low speed execution type programs (in 100 μs units) | • Stores low speed program execution time during 1 scan (in 100 μs units)<br>• Range of 000 to 900<br>• Stores each scan | | | |
| SD548 | Scan program execution time | Scan program execution time (in 1 ms units) | • Stores execution time for scan execution type program during 1 scan (in 1 ms units)<br>• Range from 0 to 65535<br>• Stores each scan | S (Every END processing) | New | |
| SD549 | | Scan program execution time (in 100 μs units) | • Stores execution time for scan execution type program during 1 scan (in 100 μs units)<br>• Range of 000 to 900<br>• Stores each scan | | | |
| SD550 | Service interval measurement module | Unit/module No. | • Sets I/O number for module that measures service interval | U | New | ○+Rem |
| SD551 | Service interval time | Module service interval (in 1 ms units) | • When SM551 is ON, stores service interval for module designated by SD550. (in 1 ms units)<br>• Range from 0 to 65535 | S (Request) | New | |
| SD552 | | Module service interval (in 100 μs units) | • When SM551 is ON, stores service interval for module designated by SD550. (in 100 μs units)<br>• Range from 000 to 900 | | | |

Special Register List

(5) Memory card

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD600 | Memory card A models | Memory card A models | • Indicates memory card A model installed<br>  | S (Initial and card removal) | New | ○ |
| SD602 | Drive 1 (RAM) capacity | Drive 1 capacity | • Drive 1 capacity is stored in 1 kbyte units | S (Initial and card removal) | New | ○ |
| SD603 | Drive 2 (ROM) capacity | Drive 2 capacity | • Drive 2 capacity is stored in 1 kbyte units | S (Initial and card removal) | New | ○ |
| SD604 | Memory card A use conditions | Memory card A use conditions | • The use conditions for memory card A are stored as bit patterns (In use when ON)<br>• The significance of these bit patterns is indicated below:<br>B0: Boot operation (QBT)<br>B1: Parameters (QPA)<br>B2: Device comments (QCD)<br>B3: Device initial value (QDI)<br>B4: File register R (QDR)<br>B5: Trace (QTS)<br>B6: Not used<br>B7: Not used<br>B8: Not used<br>B9: CPU fault history (QFD)<br>BA: Not used<br>BB: Local device (QDL)<br>BC: Not used<br>BD: Not used<br>BE: Not used<br>BF: Not used | S (Status change) | New | ○ |
| SD620 | Memory card B models | Memory card B models | • Indicates memory card B models installed<br>  <br>Drive 4 is fixed to "3" because it has built-in Flash ROM. | S (Initial) | New | ○ |
| SD622 | Drive 3 (RAM) capacity | Drive 3 capacity | • Drive 3 capacity is stored in 1 kbyte units. | S (Initial) | New | ○ |
| SD623 | Drive 4 (ROM) capacity | Drive 4 capacity | • Drive 4 capacity is stored in 1 kbyte units. | S (Initial) | New | ○ |
| SD624 | Drive 3/4 use conditions | Drive 3/4 use conditions | • The conditions for usage for drive 3/4 are stored as bit patterns. (In use when ON)<br>• The significance of these bit patterns is indicated below:<br>B0: Boot operation (QBT)<br>B1: Parameters (QPA)<br>B2: Device comments (QCD)<br>B3: Device initial value (QDI)<br>B4: File R (QDR)<br>B5: Trace (QTS)<br>B6: Not used<br>B7: Not used<br>B8: Not used<br>B9: CPU fault history (QFD)<br>B10: Not used<br>B11: Local device (QDL)<br>B12: Not used<br>B13: Not used<br>B14: Not used<br>B15: Not used | S (Status change) | New | ○ |

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD640</td><td>File register drive</td><td>Drive number:</td><td>• Stores drive number being used by file register</td><td>S (Initial)</td><td>New</td><td rowspan="5"></td></tr>
<tr><td>SD641<br>SD642<br>SD643<br>SD644<br>SD645<br>SD646</td><td>File register file name</td><td>File register file name</td><td>• Stores file register file name (with extension) selected at parameters or by use of QDRSET instruction as ASCII code.<br>B15 to B8 B7 to B0<br>SD641: Second character | First character<br>SD642: Fourth character | Third character<br>SD643: Sixth character | Fifth character<br>SD644: Eighth character | Seventh character<br>SD645: First character of extension | 2EH(.)<br>SD646: Third character of extension | Second character of extension</td><td>S (Initial)</td><td>New</td><td>○</td></tr>
<tr><td>SD647</td><td>File register capacity</td><td>File register capacity</td><td>• Stores the data capacity of the currently selected file register in 1 k word units.</td><td>S (Status change)</td><td>New</td></tr>
<tr><td>SD648</td><td>File register block number</td><td>File register block number</td><td>• Stores the currently selected file register block number.</td><td>S (Status change)</td><td>D9035</td></tr>
<tr><td>SD650</td><td>Comment drive</td><td>Comment drive number</td><td>• Stores the comment drive number selected at the parameters or by the QCDSET instruction.</td><td>S (Status change)</td><td>New</td></tr>
<tr><td>SD651<br>SD652<br>SD653<br>SD654<br>SD655<br>SD656</td><td>Comment file name</td><td>Comment file name</td><td>• Stores the comment file name (with extension) selected at the parameters or by the QCDSET instruction in ASCII code.<br>B15 to B8 B7 to B0<br>SD651: Second character | First character<br>SD652: Fourth character | Third character<br>SD653: Sixth character | Fifth character<br>SD654: Eighth character | Seventh character<br>SD655: First character of extension | 2EH(.)<br>SD656: Third character of extension | Second character of extension</td><td>S (Status change)</td><td>New</td><td rowspan="3"></td></tr>
<tr><td>SD660</td><td rowspan="2">Boot operation designation file</td><td>Boot designation file drive number</td><td>• Stores the drive number where the boot designation file ( ✻ .QBT) is being stored.</td><td>S (Initial)</td><td>New</td><td>○</td></tr>
<tr><td>SD661<br>SD662<br>SD663<br>SD664<br>SD665<br>SD666</td><td>File name of boot designation file</td><td>• Stores the file name of the boot designation file ( ✻ .QBT).<br>B15 to B8 B7 to B0<br>SD661: Second character | First character<br>SD662: Fourth character | Third character<br>SD663: Sixth character | Fifth character<br>SD664: Eighth character | Seventh character<br>SD665: First character of extension | 2EH(.)<br>SD666: Third character of extension | Second character of extension</td><td>S (Initial)</td><td>New</td></tr>
</table>

(6) Instruction-Related Registers

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD705<br>SD706</td><td>Mask pattern</td><td>Mask pattern</td><td>• During block operations, turning SM705 ON makes it possible to use the mask pattern being stored at SD705 (or at SD705 and SD706 if double words are being used) to operate on all data in the block with the masked values.</td><td>U</td><td>New</td><td>○</td></tr>
<tr><td>SD715<br>SD716<br>SD717</td><td>IMASK instruction mask pattern</td><td>Mask pattern</td><td>• Patterns masked by use of the IMASK instruction are stored in the following manner:<br>B15 B1 B0<br>SD715 I15 to I1 I0<br>SD716 I31 to I17 I16<br>SD717 I47 to I33 I32</td><td>S (During execution)</td><td>New</td><td>○</td></tr>
<tr><td>SD718<br>SD719</td><td>Accumulator</td><td>Accumulator</td><td>• For use as replacement for accumulators used in A-series programs.</td><td>S/U</td><td>New</td><td></td></tr>
<tr><td>SD720</td><td>Program No. designation for PLOAD instruction</td><td>Program No. designation for PLOAD instruction</td><td>• Stores the program number of the program to be loaded by the PLOAD instruction when designated.<br>• Designation range: 1 to 124</td><td>U</td><td>New</td><td>○</td></tr>
<tr><td>SD736</td><td>PKEY input</td><td>PKEY input</td><td>• SD that temporarily stores keyboard data input by means of the PKEY instruction.</td><td>S (During execution)</td><td>New</td><td>○</td></tr>
<tr><td>SD738<br>SD739<br>SD740<br>SD741<br>SD742<br>SD743<br>SD744<br>SD745<br>SD746<br>SD747<br>SD748<br>SD749<br>SD750<br>SD751<br>SD752<br>SD753<br>SD754<br>SD755<br>SD756<br>SD757<br>SD758<br>SD759<br>SD760<br>SD761<br>SD762<br>SD763<br>SD764<br>SD765<br>SD766<br>SD767<br>SD768<br>SD769</td><td>Message storage</td><td>Message storage</td><td>• Stores the message designated by the MSG instruction.<br>B15 to B8 B7 to B0<br>SD738 2nd character 1st character<br>SD739 4th character 3rd character<br>SD740 6th character 5th character<br>SD741 8th character 7th character<br>SD742 10th character 9th character<br>SD743 12th character 11th character<br>SD744 14th character 13th character<br>SD745 16th character 15th character<br>SD746 18th character 17th character<br>SD747 20th character 19th character<br>SD748 22nd character 21st character<br>SD749 24th character 23rd character<br>SD750 26th character 25th character<br>SD751 28th character 27th character<br>SD752 30th character 29th character<br>SD753 32nd character 31st character<br>SD754 34th character 33rd character<br>SD755 36th character 35th character<br>SD756 38th character 37th character<br>SD757 40th character 39th character<br>SD758 42nd character 41st character<br>SD759 44th character 43rd character<br>SD760 46th character 45th character<br>SD761 48th character 47th character<br>SD762 50th character 49th character<br>SD763 52nd character 51st character<br>SD764 54th character 53rd character<br>SD765 56th character 55th character<br>SD766 58th character 57th character<br>SD767 60th character 59th character<br>SD768 62nd character 61st character<br>SD769 64th character 63rd character</td><td>S (During execution)</td><td>New</td><td>○</td></tr>
<tr><td>SD774<br>TO<br>SD775</td><td>PID limit setting</td><td>0: Limit set<br>1: Limit not set</td><td>• Designate the limit for each PID loop as follows:<br>B15 B1 B0<br>SD774 Loop16 to Loop2 Loop1<br>SD775 Loop32 to Loop18 Loop17</td><td>U</td><td>New</td><td>○</td></tr>
</table>

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD781<br>TO<br>SD793</td><td>Mask pattern of IMASK instruction</td><td>Mask pattern</td><td>• Stores the mask patterns masked by the IMASK instruction as follows:<br><table><tr><th></th><th>B15</th><th></th><th>B1</th><th>B0</th></tr><tr><td>SD781</td><td>I63</td><td>to</td><td>I49</td><td>I48</td></tr><tr><td>SD782</td><td>I79</td><td>to</td><td>I65</td><td>I64</td></tr><tr><td colspan="5">to</td></tr><tr><td>SD793</td><td>I255</td><td>to</td><td>I241</td><td>I240</td></tr></table></td><td>S (During execution)</td><td>New</td><td>○</td></tr>
</table>

(7) A to Q/QnA conversion correspondences

ACPU special registers D9000 to D9255 correspond to the special registers SD1000 to SD1255 after A-series to the Q/QnA-series conversion.

These special registers are all set by the system, and users cannot use them to set program data.

Users who need to set data with these registers should edit the special registers for the Q/QnA.

However, before conversion users could set data at special registers D9200 to D9255 only, and after conversion users can also set data at registers 1200 to 1255.

For more detailed information concerning the contents of the ACPU special registers, see the individual CPU User's Manual, and the MELSECNET and MELSECNET/B data link system reference manual.

REMARK

Supplemental explanation on "Special Register for Modification" column

① For the device numbers for which a special register for modification is specified, modify it to the special register for QCPU/QnACPU.

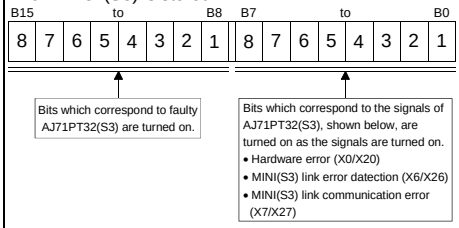
② For the device numbers for which — is specified, special register after conversion can be used.

③ Device numbers for which ☒ is specified do not function for QCPU/QnACPU.

Special Register List

<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9000</td><td>SD1000</td><td>—</td><td>Fuse blown</td><td>Number of module with blown fuse</td><td>• When fuse blown modules are detected, the lowest number of detected units is stored in hexadecimal.<br>(Example: When fuses of Y50 to 6F output modules have blown, "50" is stored in hexadecimal) To monitor the number by peripheral devices, perform monitor operation given in hexadecimal.<br>(Cleared when all contents of SD1100 to SD1107 are reset to 0.)<br>• Fuse blow check is executed also to the output modules of remote I/O stations.</td><td rowspan="2">○</td></tr>
<tr><td>D9001</td><td>SD1001</td><td>—</td><td>Fuse blown</td><td>Number of module with blown fuse</td><td>• Stores the module numbers corresponding to setting switch numbers or base slot numbers when fuse blow occurred.
<table>
<tr><th colspan="2">I/O module for A0J2</th><th colspan="2">Extension base unit</th></tr>
<tr><th>Setting switch</th><th>Stored data</th><th>Base unit slot No.</th><th>Stored data</th></tr>
<tr><td>0</td><td>1</td><td>0</td><td>5</td></tr>
<tr><td>1</td><td>2</td><td>1</td><td>6</td></tr>
<tr><td>2</td><td>3</td><td>2</td><td>7</td></tr>
<tr><td>3</td><td>4</td><td>3</td><td>8</td></tr>
<tr><td>4</td><td>5</td><td></td><td></td></tr>
<tr><td>5</td><td>6</td><td></td><td></td></tr>
<tr><td>6</td><td>7</td><td></td><td></td></tr>
<tr><td>7</td><td>8</td><td></td><td></td></tr>
</table></td></tr>
</table>

Special Register List (Continued)

| ACPU Special Conversion | Special Register after Conversion | Special Register for Modification | Name | Meaning | Details | Corresponding CPU |
|---|---|---|---|---|---|---|
| D9002 | SD1002 | — | I/O module verification error | I/O module verification error module number | • If I/O modules, of which data are different from data entered, are detected when the power is turned on, the first I/O number of the lowest number unit among the detected units is stored in hexadecimal. (Storing method is the same as that of SD1000.) To monitor the number by peripheral devices, perform monitor operation given in hexadecimal. (Cleared when all contents of SD1116 to SD1123 are reset to 0.)<br>• I/O module verify check is executed also to the modules of remote I/O terminals. | ○ |
| D9004 | SD1004 | — | MINI link errors | Stores setting status made at parameters (modules 1 to 8) | • Error status of the MINI(S3) link detected on loaded AJ71PT32(S3) is stored.<br>  | QnA |
| D9005 | SD1005 | — | AC DOWN counter | Number of times for AC DOWN | When the AC power supply module is used, 1 is added at occurrence of an instantaneous power failure of within 20ms. (The value is stored in BIN code.)It is reset when power is switched from OFF to ON. | ○ |
| | | | | | When the DC power supply module is used, 1 is added at occurrence of an instantaneous power failure of within 10ms. (The value is stored in BIN code.)It is reset when power is switched from OFF to ON. | |
| | | | | | When the DC power supply module is used, 1 is added at occurrence of an instantaneous power failure of within 1ms. (The value is stored in BIN code.)It is reset when power is switched from OFF to ON. | QnA |
| D9008 | SD1008 | SD0 | Self-diagnosis error | Self-diagnosis error number | • When error is found as a result of self-diagnosis, error number is stored in BIN code. | ○ |
| D9009 | SD1009 | SD62 | Annunciator detection | F number at which external failure has occurred | • When one of F0 to 255 is turned on by OUT F or SET F, the F number, which has been detected earliest among the F numbers which have turned on, is stored in BIN code.<br>• SD62 can be cleared by RST F or LEDR instruction. If another F number has been detected, the clearing of SD62 causes the next number to be stored in SD62. | |
| | | | | | • When one of F0 to 255 is turned on by OUT F or SET F, the F number, which has been detected earliest among the F numbers which have turned on, is stored in BIN code.<br>• SD62 can be cleared by executing RST F or LEDR instruction or moving INDICATOR RESET switch on CPU front to ON position. If another F number has been detected, the clearing of SD62 causes the nest number to be stored in SD62. | |
| D9010 | SD1010 | | Error step | Step number at which operation error has occurred. | • When operation error has occurred during execution of application instruction, the step number, at which the error has occurred, is stored in BIN code. Thereafter, each time operation error occurs, the contents of SD1010 are renewed. | |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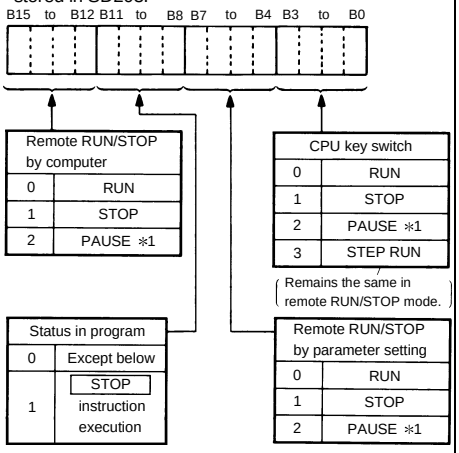
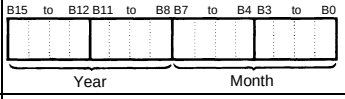
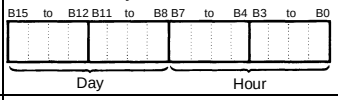
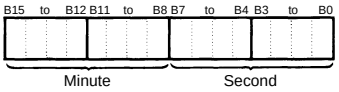
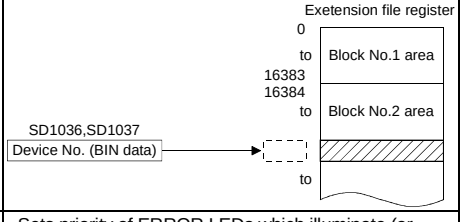
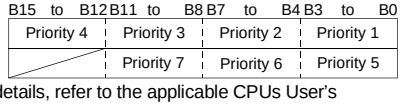
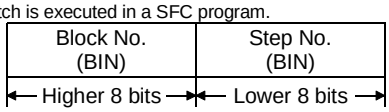
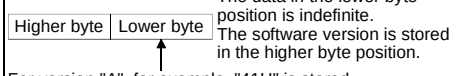
Special Register List (Continued)

| ACPU Special Conversion | Special Register after Conversion | Special Register for Modification | Name | Meaning | Details | Corresponding CPU |
|---|---|---|---|---|---|---|
| D9011 | SD1011 | | Error step | Step number at which operation error has occurred. | • When operation error has occurred during execution of application instruction, the step number, at which the error has occurred, is stored in BIN code. Since storage into SD1011 is made when SM1011 changes from off to on, the contents of SD1011 cannot be renewed unless SM1011 is cleared by user program. | |
| D9014 | SD1014 | | I/O control mode | I/O control mode number | • The I/O control mode set is returned in any of the following numbers:<br>0. Both input and output in direct mode<br>1. Input in refresh mode, output in direct mode<br>3. Both input and output in refresh mode | |
| D9015 | SD1015 | SD203 | Operating status of CPU | Operating status of CPU | • The operation status of CPU as shown below are stored in SD203.<br>  <br>∗1 When the CPU is in RUN mode and SM1040 is off, the CPU remains in RUN mode if changed to PAUSE mode. | ○ |
| D9016 | SD1016 | | Program number | 0: Main program (ROM)<br>1: Main program (RAM)<br>2: Subprogram 1 (RAM)<br>3: Subprogram 2 (RAM)<br>4: Subprogram 3 (RAM)<br>5: Subprogram 1 (ROM)<br>6: Subprogram 2 (ROM)<br>7: Subprogram 3 (ROM)<br>8: Main program ($E^2$PROM)<br>9: Subprogram 1 ($E^2$PROM)<br>A: Subprogram 2 ($E^2$PROM)<br>B: Subprogram 3 ($E^2$PROM) | • Indicates which sequence program is run presently. One value of 0 to B is stored in BIN code. | |
| D9017 | SD1017 | SD520 | Scan time | Minimum scan time (10 ms units) | • If scan time is smaller than the content of SD520, the value is newly stored at each END. Namely, the minimum value of scan time is stored into SD520 in BIN code. | |
| D9018 | SD1018 | SD524 | Scan time | Scan time (10 ms units) | • Scan time is stored in BIN code at each END and always rewritten. | |

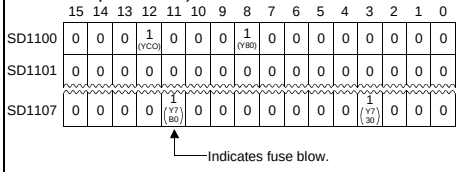
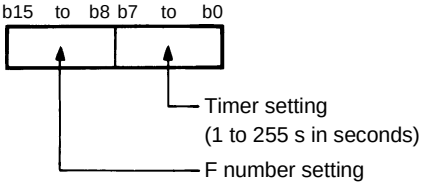
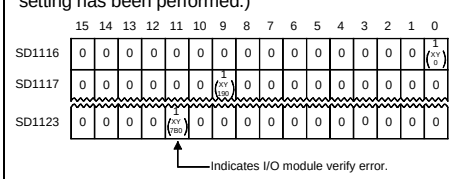
Special Register List (Continued)

| ACPU Special Conversion | Special Register after Conversion | Special Register for Modification | Name | Meaning | Details | Corresponding CPU |
|---|---|---|---|---|---|---|
| D9019 | SD1019 | SD526 | Scan time | Maximum scan time (10 ms units) | • If scan time is larger than the content of SD526, the value is newly stored at each END. Namely, the maximum value of scan time is stored into SD526 in BIN code. | |
| D9020 | SD1020 | | Constant scan | Constant scan time (User sets in 10 ms units) | • Sets the interval between consecutive program starts in multiples of 10 ms.<br>0: No setting<br>1 to 200: Set. Program is executed at intervals of (set value) × 10 ms. | |
| D9021 | SD1021 | — | Scan time | Scan time (1 ms units) | • Scan time is stored and updated in BIN code after every END. | |
| D9022 | SD1022 | SD412 | 1 second counter | Count in units of 1ms. | • When the PC CPU starts running, it starts counting 1 every second.<br>• It starts counting up from 0 to 32767, then down to -32768 and then again up to 0. Counting repeats this routine. | |
| D9025 | SD1025 | SD210 | Clock data | Clock data (year, month) | • Stores the year (2 lower digits) and month in BCD.<br>  <br>Example:<br>1987, July<br>H8707 | |
| D9026 | SD1026 | SD211 | Clock data | Clock data (day, hour) | • Stores the day and hour in BCD.<br>  <br>Example<br>31th, 10 o'clock<br>H3110 | |
| D9027 | SD1027 | SD212 | Clock data | Clock data (minute, second) | • Stores the Minute and second in BCD.<br>  <br>Example:<br>35 minutes,<br>48 seconds<br>H3548 | |
| D9028 | SD1028 | SD213 | Clock data | Clock data (day of week) | • Stores the day of the week in BCD.<br> <br>Example:<br>Friday<br>H0005<br>Day of the week: 0 Sunday; 1 Monday; 2 Tuesday; 3 Wednesday; 4 Thursday; 5 Friday; 6 Saturday | ○ |
| D9035 | SD1035 | SD648 | Extension file register | Use block No. | • Stores the block No. of the extension file register being used in BCD code. | |
| D9036 | SD1036 | | Extension file registerfor designation of device number | Device number when individual devices from extension file register are directly accessed | • Designate the device number for the extension file register for direct read and write in 2 words at SD1036 and SD1037 in BIN data.<br>Use consecutive numbers beginning with R0 of block No. 1 to designate device numbers.<br>  | |
| D9037 | SD1037 | | | | | |
| D9038 | SD1038 | SD207 | LED display priority ranking | Priorities 1 to 4 | • Sets priority of ERROR LEDs which illuminate (or flicker) to indicate errors with error code numbers.<br>• Configuration of the priority setting areas is as shown below.<br>  <br>• For details, refer to the applicable CPUs User's Manual and the ACPU Programming manual (Fundamentals). | |
| D9039 | SD1039 | SD208 | | Priorities 5 to 7 | | |

Special Register List (Continued)

| ACPU Special Conversion | Special Register after Conversion | Special Register for Modification | Name | Meaning | Details | Corresponding CPU |
|---|---|---|---|---|---|---|
| D9044 | SD1044 | | For sampling trace | Step or time during sampling trace | • Turned on/off with a peripheral device.<br>At scanning----------0<br>At time ----------Time (10 msec unit)<br>Stores the value in BIN code. | ○ |
| D9049 | SD1049 | | Work area for SFC | Block number of extension file register | • Stores the block number of the expansion file register which is used as the work area for the execution of a SFC program in a binary value.<br>• Stores "0" if an empty area of 16K bytes or smaller, which cannot be expansion file register No. 1, is used or if SM320 is OFF. | |
| D9050 | SD1050 | | SFC program error number | Error code generated by SFC program | • Stores code numbers of errors occurred in the SFC program in BIN code.<br>0: No error<br>80: SFC program parameter error<br>81: SFC code error<br>82: Number of steps of simultaneous execution exceeded<br>83: Block start error<br>84: SFC program operation error | |
| D9051 | SD1051 | | Error block | Block number where error occurred | • Stores the block number in which an error occurred in the SFC program in BIN code.<br>In the case of error 83 the starting block number is stored. | |
| D9052 | SD1052 | | | Step number where error occurred | • Stores the step number in which error 84 occurred in the SFC program in BIN code.<br>Stores "0" when errors 80, 81 and 82 occurred.<br>Stored the block starting step number when error 83 occurred. | |
| D9053 | SD1053 | | Error transition | Transition condition number where error occurred | • Stores the transfer condition number in which error 84 occurred in the SFC program in BIN code.<br>Stored "0" when errors 80, 81, 82 and 83 occurred. | |
| D9054 | SD1054 | | Error sequence step | Sequence step number where error occurred | • Stores the sequence step number of transfer condition and operation output in which error 84 occurred in the SFC program in BIN code. | |
| D9055 | SD1055 | SD812 | Status latch | Status latch step | • Stores the step number when status latch is executed.<br>• Stores the step number in a binary value if status latch is executed in a main sequence program.<br>• Stores the block number and the step number if status latch is executed in a SFC program.<br>  | |
| D9060 | SD1060 | SD392 | Software version | Software version of internal software | • Stores the software version of the internal system in ASCII code.<br>  <br>For version "A", for example, "41H" is stored.<br>Note: The software version of the initial system may differ from the version indicated by the version information printed on the rear of the case. | QnA |
| D9072 | SD1072 | | PLC communications check | Computer link data check | • In the self-loopback test of the serial communication module, the serial communication module writes/reads data automatically to make communication checks. | ○ |
| D9081 | SD1081 | SD714 | Number of empty blocks in communications request registrtion area | Number of empty blocks in communications request registration area | • Stores the number of empty blocks in the communication request registration area to the remote terminal module connected to the MELSECNET/MINI-S3 master unit, A2C or A52G. | QnA |

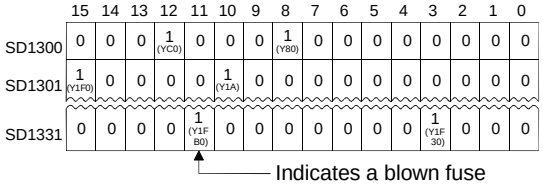
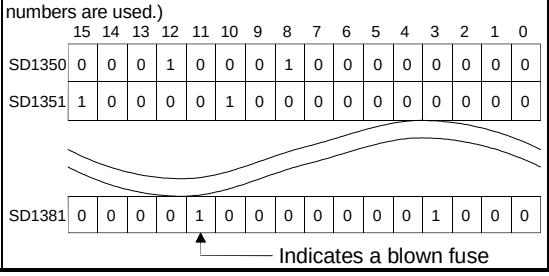
Special Register List (Continued)

| ACPU Special Conversion | Special Register after Conversion | Special Register for Modification | Name | Meaning | Details | Corresponding CPU |
|---|---|---|---|---|---|---|
| D9085 | SD1085 | | Register for setting time check value | Default value 10s | • Sets the time check time of the data link instructions (ZNRD, ZNWR) for the MELSECNET/10.<br>• Setting range: 1 s to 65535 s (1 to 65535)<br>• Setting unit: 1 s<br>• Default value: 10 s (If 0 has been set, default 10 s is applied) | |
| D9090 | SD1090 | | Number of special functions modules over | Number of special functions modules over | • For details, refer to the manual of each microcomputer program package. | |
| D9091 | SD1091 | | Detailed error code | Self-diagnosis detailed error code | • Stores the detail code of cause of an instruction error. | |
| D9094 | SD1094 | | Head I/O number for replacement | Head I/O number for replacement | • Stores upper 2 digits of the head I/O address of I/O modules to be loaded or unloaded during online mode in BIN code.<br>Example) Input module X2F0 → H2F | |
| D9100 | SD1100 | — | Fuse blown module | Bit pattern in units of 16 points, indicating the modules whose fuses have blown | • Output module numbers (in units of 16 points), of which fuses have blown, are entered in bit pattern. (Preset output unit numbers when parameter setting has been performed.)<br>  <br>• Fuse blow check is executed also to the output module of remote I/O station.<br>(If normal status is restored, clear is not performed. Therefore, it is required to perform clear by user program.) | |
| D9101 | SD1101 | | | | | |
| D9102 | SD1102 | | | | | |
| D9103 | SD1103 | | | | | |
| D9104 | SD1104 | | | | | |
| D9105 | SD1105 | | | | | |
| D9106 | SD1106 | | | | | |
| D9107 | SD1107 | | | | | |
| D9108 | SD1108 | — | Step transfer monitoring timer setting | Timer setting valve and the f number at time out | • Sets value for the step transfer monitoring timer and the number of F which turns on when the monitoring timer timed out.<br>  <br>(By turning on any of MSM708 to SM1114, the monitoring timer starts. If the transfer condition following a step which corresponds to the timer is not established within set time, set annunciator (F) is tuned on.) | ○ |
| D9109 | SD1109 | | | | | |
| D9110 | SD1110 | | | | | |
| D9111 | SD1111 | | | | | |
| D9112 | SD1112 | | | | | |
| D9113 | SD1113 | | | | | |
| D9114 | SD1114 | | | | | |
| D9116 | SD1116 | — | I/O module verification error | Bit pattern, in units of 16 points, indicating the modules with verification errors. | • When I/O modules, of which data are different from those entered at power-on, have been detected, the I/O unit numbers (in units of 16 points) are entered in bit pattern. (Preset I/O unit numbers when parameter setting has been performed.)<br>  <br>• I/O module verify check is executed also to remote I/O station modules.<br>(If normal status is restored, clear is not performed. Therefore, it is required to perform clear by user program.) | |
| D9117 | SD1117 | | | | | |
| D9118 | SD1118 | | | | | |
| D9119 | SD1119 | | | | | |
| D9120 | SD1120 | | | | | |
| D9121 | SD1121 | | | | | |
| D9122 | SD1122 | | | | | |
| D9123 | SD1123 | | | | | |

Special Register List (Continued)

<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9124</td><td>SD1124</td><td>SD63</td><td>Annunciator detection quantity</td><td>Annunciator detection quantity</td><td>• When one of F0 to 255 (F0 to 2047 for AuA and AnU) is turned on by SET F 1 is added to the contents of SD63. When RST F or LEDR instruction is executed, 1 is subtracted from the contents of SD63.<br>• Quantity, which has been turned on by SET F is stored into SD63 in BIN code. The value of SD63 is maximum 8.</td><td rowspan="11">○</td></tr>
<tr><td>D9125</td><td>SD1125</td><td>SD64</td><td rowspan="10">Annunciator detection number</td><td rowspan="10">Annunciator detection number</td><td rowspan="10">• When one of F0 to 255 (F0 to 2047 for AuA and AnU) is turned on by SET F, F number, which has turned on, is entered into SD64 to SD71 in due order in BIN code.<br>• F number, which has been turned off by RST F, is erased from SD64 to SD71, and the contents of data registers succeeding the data register, where the erased F number was stored, are shifted to the preceding data registers.<br>• By executing LEDR instruction, the contents of SD64 to SD71 are shifted upward by one.<br>• When there are 8 annunciator detections, the 9th one is not stored into SD64 to SD71 even if detected.<br>
<table>
<tr><th></th><th>SET F50</th><th>SET F25</th><th>SET F99</th><th>RST F25</th><th>SET F15</th><th>SET F70</th><th>SET F65</th><th>SET F38</th><th>SET F110</th><th>SET F151</th><th>SET F210</th><th>LEDR</th></tr>
<tr><td>SD62</td><td>0</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>99</td></tr>
<tr><td>SD63</td><td>0</td><td>1</td><td>2</td><td>3</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>8</td><td>8</td></tr>
<tr><td>SD64</td><td>0</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td><td>99</td></tr>
<tr><td>SD65</td><td>0</td><td>0</td><td>25</td><td>25</td><td>99</td><td>99</td><td>99</td><td>99</td><td>99</td><td>99</td><td>99</td><td>99</td><td>15</td></tr>
<tr><td>SD66</td><td>0</td><td>0</td><td>0</td><td>99</td><td>0</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>70</td></tr>
<tr><td>SD67</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>70</td><td>70</td><td>70</td><td>70</td><td>70</td><td>70</td><td>65</td></tr>
<tr><td>SD68</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>65</td><td>65</td><td>65</td><td>65</td><td>65</td><td>38</td></tr>
<tr><td>SD69</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>38</td><td>38</td><td>38</td><td>38</td><td>110</td></tr>
<tr><td>SD70</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>110</td><td>110</td><td>110</td><td>151</td></tr>
<tr><td>SD71</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>151</td><td>151</td><td>210</td></tr>
</table>
</td></tr>
<tr><td>D9126</td><td>SD1126</td><td>SD65</td></tr>
<tr><td>D9127</td><td>SD1127</td><td>SD66</td></tr>
<tr><td>D9128</td><td>SD1128</td><td>SD67</td></tr>
<tr><td>D9129</td><td>SD1129</td><td>SD68</td></tr>
<tr><td>D9130</td><td>SD1130</td><td>SD69</td></tr>
<tr><td>D9131</td><td>SD1131</td><td>SD70</td></tr>
<tr><td>D9132</td><td>SD1132</td><td>SD71</td></tr>
</table>

(8) Fuse blown module

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD1300</td><td rowspan="10">Fuse blown module</td><td rowspan="10">Bit pattern in units of 16 points, indicating the modules whose fuses have blown<br>0: No blown fuse<br>1: Blown fuse present</td><td rowspan="10">• The numbers of output modules whose fuses have blown are input as a bit pattern (in units of 16 points).<br>(If the module numbers are set by parameter, the parameter-set numbers are stored.)<br>• Also detects blown fuse condition at remote station output modules<br>  <br><br>• Not cleared even if the blown fuse is replaced with a new one.<br>This flag is cleared by error resetting operation (refer to 11.3.).</td><td rowspan="10">S (Error)</td><td>D9100</td><td rowspan="11">○+Rem</td></tr>
<tr><td>SD1301</td><td>D9101</td></tr>
<tr><td>SD1302</td><td>D9102</td></tr>
<tr><td>SD1303</td><td>D9103</td></tr>
<tr><td>SD1304</td><td>D9104</td></tr>
<tr><td>SD1305</td><td>D9105</td></tr>
<tr><td>SD1306</td><td>D9106</td></tr>
<tr><td>SD1307</td><td>D9107</td></tr>
<tr><td>SD1308</td><td>New</td></tr>
<tr><td>SD1309 to SD1330</td><td>New to New</td></tr>
<tr><td>SD1331</td><td>New</td></tr>
<tr><td>SD1350 to SD1381</td><td>External power supply disconnected module (For future expansion)</td><td>Bit pattern in units of 16 points, indicating the modules whose external power supply has been disconnected<br>0: External power supply disconnected<br>1: External power supply is not disconnected</td><td>The module number (in units of 16 points) whose external power supply has been disconnected is input as a bit pattern.<br>(If the module numbers are set by parameter, the parameter-set numbers are used.)<br>  <br></td><td>S (Error)</td><td>New</td></tr>
</table>

Special Register List (Continue)

(9) I/O module verification

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD1400<br>SD1401<br>SD1402<br>SD1403<br>SD1404<br>SD1405<br>SD1406<br>SD1407<br>SD1408 | I/O module verification error | Bit pattern, in units of 16 points, indicating the modules with verification errors.<br>0: No I/O verification errors<br>1: I/O verification error present | • When the power is turned on, the module numbers of the I/O modules whose information differs from the registered I/O module information are set in this register (in units of 16 points). (If the I/O numbers are set by parameter, the parameter-set numbers are stored.)<br>• Also detects I/O module information<br>15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0<br>D9116 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 (X Y 0)<br>D9117 0 0 0 0 0 0 1 (X Y 90) 0 0 0 0 0 0 0 0 0<br>D9123 0 1 (X Y FE0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0<br>Indicates an I/O module verification error<br>• Not cleared even if the blown fuse is replaced with a new one. This flag is cleared by error resetting operation (refer to 11.3.). | S (Error) | D9116<br>D9117<br>D9118<br>D9119<br>D9120<br>D9121<br>D9122<br>D9123<br>New | ○+Rem |
| SD1409<br>to<br>SD1430 | | | | | New to New | |
| SD1431 | | | | | New | |

(10) Process control instructions

| Number | Name | Meaning | Explanation | Set by (When set) | Corresponding ACPU D9□□□ | Corresponding CPU |
|---|---|---|---|---|---|---|
| SD1500<br>SD1501 | Basic period | Basic period tome | • Set the basic period (1 second units) use for the process control instruction using floating point data.<br>Floating points data = SD1501 SD1500 | U | New | Q4AR |
| SD1502 | Process control instruction detail error code | Process control instruction detail error code | • Shows the detailed error contents for the error that occurred in the process control instruction | S (Error occurrence) | New | |
| SD1503 | Process control instruction generated error location | Process control instruction generated error location | • Shows the error process block that occurred in the process control instruction. | S (Error occurrence) | New | |
| SD1506<br>SD1507 | Dummy device | Dummy device | • Used to specify dummy devices by a process control instruction | U | New | |

# MEMO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# APPENDICES

## APPENDIX 1 Error Code Return to Origin During General Data Processing



The CPU module returns an error code to the general data processing request origin when an error occurs and there is a general data processing request form the peripheral equipment, intelligent function module, or network system. If an error occurs when a general data processing is requested from the peripheral devices, intelligent function module, and network system.

| POINT |
| --- |
| This error code is not an error that is detected by the CPU module self-diagnostic function, so it is not stored in the special relay SD0.<br>When the request origin is a GX Developer, a message or an error code is displayed.<br>When the request origin is an intelligent function module or network system, an error is returned to the process that was requested. |

## APPENDIX 1.1 Error code overall explanation

These error codes differs depending on the error No. of the location the error was detected. The following table shows the relationship between the error detection location and the error code.

| Error detection location | Error Code (hexadecimal) | Error description reference destination |
| --- | --- | --- |
| CPU module | $4000_H$ to $4FFF_H$ | Refer to Appendix 1.2. |
| Intelligent function module | $7000_H$ to $7FFF_H$ | User's manuals of intelligent function module |
| Network system | $F000_H$ to $FFFF_H$ | Q Corresponding MELSECNET/H Network System Reference Manual |


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## APPENDIX 1.2 Description of the errors of the error codes (4000H to 4FFFH)

The error contents of the error codes (4000H to 4FFFH) detected by the CPU module and the messages displayed by the GX Developer are shown below.

| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 4000H | CPU related error | Sum check error | Check the connection status of the connection cable with the CPU module |
| 4001H | | Remote request that is not handled was executed. | Check the requested remote operation. |
| 4002H | | Command for which a global request cannot be performed was executed. | Check the requested command. |
| 4003H | | | |
| 4004H | | CPU module cannot execute the request contents because it is in system protect | Turn off the CPU module system protect switch. |
| 4005H | | The volume of data handled according to the specified request is too large. | Reduce the volume of data to that which can be processed at the specified request. |
| 4006H | | The password cannot be deleted. | Delete the set password. |
| 4008H | | The CPU module is not BUSY (The buffer is not vacant). | After the free time has passed, reexecute the request. |
| 4010H | CPU mode error | The CPU module is running to the request contents cannot be executed. | Execute after setting the CPU module to STOP status. |
| 4011H | | The CPU module is not in the STEP-RUN status so the request contents cannot be executed. | Execute after setting the CPU module to STEP-RUN status. |
| 4013H | | An attempt was made to change any parameter value during an online module change. | Change the parameter values after an online module change is over. |




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| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 4021H | CPU file related error | The specified drive memory does not exist or there is an error. | Check the specified drive memory status. |
| 4022H | | The file with the specified file name or file No. does not exist. | Check the specified file name and file No. |
| 4023H | | The file name and file No. of the specified file do not match. | Delete the file and then recreate the file. |
| 4024H | | The specified file cannot be handled by a user. | Do not access the specified file. |
| 4025H | | The specified file is processing the request from a different location. | Forcefully execute the request forcibly.<br>Or reexecute the request after the processing from the other location has ended. |
| 4026H | | The keyword specification set in the corresponding drive memory is required. | Access by specifying the keyword set in the corresponding drive memory. |
| 4027H | | The specified range exceeds the file range. | Check the specified range and access within that range. |
| 4028H | | The same file already exists. | Forcefully execute the request forcibly.<br>Or reexecute after changing the file name. |
| 4029H | | The specified file capacity cannot be obtained. | Revise the specified file contents.<br>Or reexecute after cleaning up and reorganizing the specified drive memory. |
| 402BH | | The request contents cannot be executed in the specified drive memory. | Do not execute a request for a specified drive memory in which an error has occurred. |
| 402CH | | Currently the request contents cannot be executed. | Reexecute after the free wait time has passed. |
| 4030H | CPU device specified error | The specified device name cannot be handled. | Check the specified device name. |
| 4031H | | The specified device No. is outside the range. | Check the specified device No. |
| 4032H | | There is a mistake in the specified device qualification. | Check the specified device qualification method. |
| 4033H | | Writing cannot be done because the specified device is for system use. | Do not write the data in the specified device, and do not turn on or off. |
| 4040H | Intelligent function module specification error | The request contents cannot be executed in the specified intelligent function module. | Do not conduct a request for a specified intelligent function module in which an error has occurred. |
| 4041H | | The access range exceeds the buffer memory range of the specified intelligent function module. | Check the header address and access number of points and access using a range that exists in the intelligent function module. |
| 4042H | | The specified intelligent function module cannot be accessed. | Check that the specified intelligent function module is operating normally. |
| 4043H | | The intelligent function module does not exist in the specified position. | Check the header I/O No. of the specified intelligent function module. |
| 4044H | | A control bus error has occurred. | Check that there is no error in the intelligent function module or in the hardware of another module. |
| 4045H | | The setting required to conduct simulation has not been made. | Conduct a simulation setting. |
| 4046H | | The device header or number of points in the simulation is not in 16point unit. | Check the device header No. and number of points and correct them to 16 point units. |
| 4149H | | Another GX Developer was used to execute online module change. | Select between stopping and continuing the online module change |
| 414AH | | An attempt was made to execute the online module change of a non-control module. | Stop the the online module change of a non-control module |
| 414BH | | An attempt was made to execute online module change before the PC CPU module starts. | Perform an online module change after the PC CPU module has started. |
| 414FH | | Online module change is inhibited by the parameter setting in the multiple PLC system. | Stop an online module change.<br>Perform an online module change after changing the parameter setting. |

| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 4050H | Protect error | The request contents cannot be executed because the memory card write protect switch is on. | Turn off the memory card write protect switch. |
| 4051H | | The specified device memory cannot be accessed. | Check the following and make it countermeasures.<br>• Is the memory one that can be used?<br>• Is the specified drive memory correctly installed? |
| 4052H | | The specified file attribute is read only so the data cannot be written. | Do not write data in the specified file.<br>Or change the file attribute. |
| 4053H | | An error occurred when writing data to the specified drive memory. | Check the specified drive memory.<br>Or reexecute write after changing the corresponding drive memory. |
| 4054H | | An error occurred when deleting the data in the specified drive memory. | Check the specified drive memory.<br>Or re-erase after replacing the corresponding drive memory. |
| 4060H | Online registration error | The monitor condition registration CPU module system area is already being used by another piece of equipment. | Reexecute monitor after the monitor by the other equipment has completed. Or increase the system area of the program memory using the format with option. |
| 4061H | | Communication failed. | Execute a re-communication. |
| 4062H | | The monitor detail condition is already being used and monitored by another piece of equipment. | Do not conduct monitor detail condi-tions from the specified equipment.<br>Or reexecute monitoring after deleting the monitor detail conditions of the other equipment. |
| 4063H | | The number of the file lock registrations exceeds 16. | Reduce the number of registrations to 16 or less. |
| 4064H | | There is a problem with the specified contents. | Check the specified contents. |
| 4065H | | The device allocation information differs from the parameter. | Check the parameter.<br>Or check the data. |
| 4066H | | A keyword that differs from the keyword set in the specified driver memory has been specified. | Check the specified keyword. |
| 4067H | | The specified monitor file cannot be obtained. | Conduct monitor after obtaining the monitor file. |
| 4068H | | Registration/deletion cannot be conducted because the specified command is being executed. | Reexecute the command after the request from the other equipment has been completed. |
| 4069H | | The conditions have already been reached by the device match. | Check the monitor conditions.<br>Or reconduct monitor registration and execute monitor. |
| 406AH | | A drive other than Nos. 1 to 3 has been specified. | Check the specified drive and specify the correct drive. |
| 4070H | Circuit inquiry | Program before correction and the registration program differ. | Check the registration program and make the programs match. |
| 4080H | Other errors | Data error | Check the requested data contents. |
| 4081H | | The sort subject cannot be detected. | Check the data to be searched. |
| 4082H | | The specified command is executing and therefore cannot be executed. | Reexecute the command after the request from the other equipment is completed. |
| 4083H | | Trying to execute a program that is not registered in the parameter. | Register the program to be executed in the parameter. |


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| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 4084H | Other errors | The specified pointer P, I cannot be detected. | Check the data to be searched. |
| 4085H | | Pointer P, I cannot be specified because the program is not specified in the parameter. | Specify pointer P, I after registering the program to be executed in the parameter. |
| 4086H | | Pointer P, I has already been added. | Check the pointer No. to be added and make correction. |
| 4087H | | Trying to specify too many pointers. | Check the specified pointer and make a correction. |
| 4088H | | The specified step No. was not in the instruction header. | Check the specified step No. and make a correction. |
| 4089H | | An END instruction was inserted/deleted while the CPU module was running. | Conduct Insert/removal after the CPU module has stopped. |
| 408AH | | The file capacity was exceeded by the write during Run. | Write the program after the CPU module has stopped. |
| 408BH | | The remote request cannot be executed. | Reexecute after the CPU module is in a status where the mode request can be executed. |
| 4090H | Online registration errors during SFC STEP-RUN | The block breakpoint number was exceeded. | Check the number of settings and make a correction. |
| 4091H | | There is a mistake in the block breakpoint registration number. | Check the number of registrations and make a correction. |
| 4092H | | The step breakpoint number has been exceeded. | Check the number of registrations and make a correction. |
| 4093H | | There is a mistake in the step breakpoint registration number. | Check the number of registrations and make a correction. |
| 4094H | | Tried to execute a request during block continuous processing. | Reconduct the request after the processing has ended. |
| 4095H | | Tried to execute a request during block forced execution processing. | Reconduct the request after the processing has ended. |
| 4096H | | Tried to execute a request during step continuous processing. | Reconduct the request after the processing has ended. |
| 4097H | | Tried to execute a request during step forced execution processing. | Reconduct the request after the processing has ended. |
| 4098H | | Tried to execute a request during one step continuous processing. | Reconduct the request after the processing has ended. |
| 4099H | | Tried to execute a request during one step forced execution processing. | Reconduct the request after the processing has ended. |
| 409AH | | Tried to execute a request during block forced end processing. | Reconduct the request after the processing has ended. |
| 409BH | | Tried to execute a request during step forced end processing. | Reconduct the request after the processing has ended. |
| 409CH | | Tried to execute a request during hold step reset processing. | Reconduct the request after the processing has ended. |
| 409DH | | A block No. that has not been created or that exceeds the range has been specified. | Check the setting contents and make a correction. |
| 409EH | | A step No. that was not created was specified. | Check the setting contents and make a correction. |
| 409FH | | The specified number of cycles is outside the range. | Check the number of registrations and make a correction. |


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| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 40A0H | SFC device specification error | A block No. outside the range was specified. | Check the setting contents and make a correction. |
| 40A1H | | A number of blzocks that exceeds the range was specified. | Check the number of settings and make a correction. |
| 40A2H | | A step No. that is outside the range was specified. | Check the setting contents and make a correction. |
| 40A3H | | A number of steps that exceeds the range was specified. | Check the number of settings and make a correction. |
| 40A4H | | A sequence step No. outside the range was specified. | Check the setting contents and make a correction. |
| 40A5H | | The specified device was outside the range. | Check the number of settings and make a correction. |
| 40A6H | | There is a mistake in the block specification pattern or the step specification pattern. | Check the setting contents and make a correction. |
| 40B0H | SFC file related error | The wrong drive was specified. | Check the setting contents and make a correction. |
| 40B1H | | The specified program does not exist. | Check the specified file name and make a correction. |
| 40B2H | | The specified program was not an SFC program. | Check the specified file name and make a correction. |
| 40B3H | | There was an SFC dedicated instruction in the write during run area. | Check the setting contents and make a correction. |
| 4110H | CPU mode error | Since the CPU module is in a stop error status, it cannot execute the request. | Execute the request again after resetting the CPU module. |
| 4111H | | Since the other CPU modules have not started up, the CPU module cannot execute the request. | Execute the request again after the other CPU modules have started up. |
| 41D0H | File-related errors | The route directory has no free space. | Increase the free space of the specified drive.<br>Optimize the specified drive to increase continuous free areas. |
| 41D1H | | The file pointer is insufficient. | Specify the correct file pointer. |
| 41D5H | | The file of the same name exists. | Change the file name. |
| 41DFH | | The disk is write-protected. | Cancel the write protection of the disk and execute again. |
| 41E0H | | The drive does not respond. | Check for the specified drive. If it exists, check its status. |
| 41E1H | | The address or sector is not found. | Check if the target is a ROM drive or not. |
| 41E4H | | The file cannot be accessed properly. | Execute again after resetting the CPU. |
| 41E8H | | The drive format information is illegal. | Format the target drive once. |
| 41E9H | | At the time of file access, time-out occurred during waiting for access. | Execute again after some time. |
| 41EBH | | The path name is too long. | Check the length of the path name. |
| 41ECH | | The disk is logically broken. | Change the specified drive. |
| 41EDH | | An attempt to make a file continuous failed. (There are enough free file areas, which cannot be taken continuously.) | Optimize the specified drive to increase continuous free areas. |
| 41F2H | | The specified drive is ROM. | Check the specified drive. (Format it for RAM.) |
| 41FBH | | The same starting source has already opened the specified file. | Check if it is being processed by another application. |
| 41FCH | | An attempt was made to erase the mounted drive. | Execute again after dismounting the drive. |
| 41FDH | | The Flash ROM is not formatted. | Erase the specified drive. |
| 41FEH | | The memory card is not inserted. | Insert or reinsert the memory card. |
| 41FFH | | The memory card type differs. | Check the memory card type. |
| 4200H | Online module change-related error | The requested processing cannot be performed since online module change is not enabled in the setting of the multiple PLC setting parameter. | Do not make a request where an error occurred, or make a request again after enabling online module change in the setting of the multiple PLC setting parameter. |
| 4201H | | The requested processing cannot be performed since online module change is enabled in the setting of the multiple PLC setting parameter. | Do not make a request where an error occurred, or make a request again after disabling online module change in the setting of the multiple PLC setting parameter. |
| 4202H | | The requested processing cannot be performed since an online module change is being performed. | Make a request again after completion of the online module change. |
| 4210H | | The specified head I/O number is outside the range. | When making a request, specify the head I/O number of the module that will be changed online. |
| 4211H | | An online module change request is abnormal. | Check the command used to make a request. |

| Error code (hexadecimal) | Error item | Error description | Countermeasure |
|---|---|---|---|
| 4212H | Online module change-related error | An online module change is already being made for other equipment. | Make a request again after completion of the online module change, or continue after changing the connection path. |
| 4213H | | The specified head I/O number differs from the head I/O number of the module being changed online. | When making a request, specify the head I/O number of the module being changed online. |
| 4214H | | The specified module differs from the one changed online. | Make a request again after mounting the module that is the same as the one changed online. |
| 4215H | | The specified module does not exist. | When making a request, specify the head I/O number of the module that will be changed online, or make a request again after mounting the module. |
| 4216H | | The specified module is faulty. | Make a request again after changing the module. |
| 4217H | | There is no response from the specified module. | Continue the online module changing operation. |
| 4218H | | The specified module is incompatible with online module change. | Do not make a request where an error occurred, or make a request again to the module compatible with online module change. |
| 4219H | | The specified module is mounted on the extension base that has no power supply. | Do not make a request to the module that is mounted on the extension base or main base that has no power supply. |
| 421AH | | The specified module is not in a control group. | Make a request to the CPU module that controls the specified module. |
| 421BH | | An error occurred in the setting of the initial setting parameter of the intelligent function module. | Resume processing after checking the contents of the intelligent function module buffer memory. |
| 4A00H | Link related error | The specified station could not be accessed because a routing parameter was not set in the related station. | Set the routing parameter for accessing the specified station in the related station. |
| 4A01H | | The network with the No. set in the routing parameter does not exist. | Check the routing parameter set in the related station and make a correction. |
| 4A02H | | Cannot access the specified station. | Check if an error has occurred in the network module and if the module is offline. |
| 4B00H | Object related error | An error occurred in the access destination or in a relay station. | Check if an error has occurred in the specified access destination or in a relay station to the access station and if so take countermeasures. |


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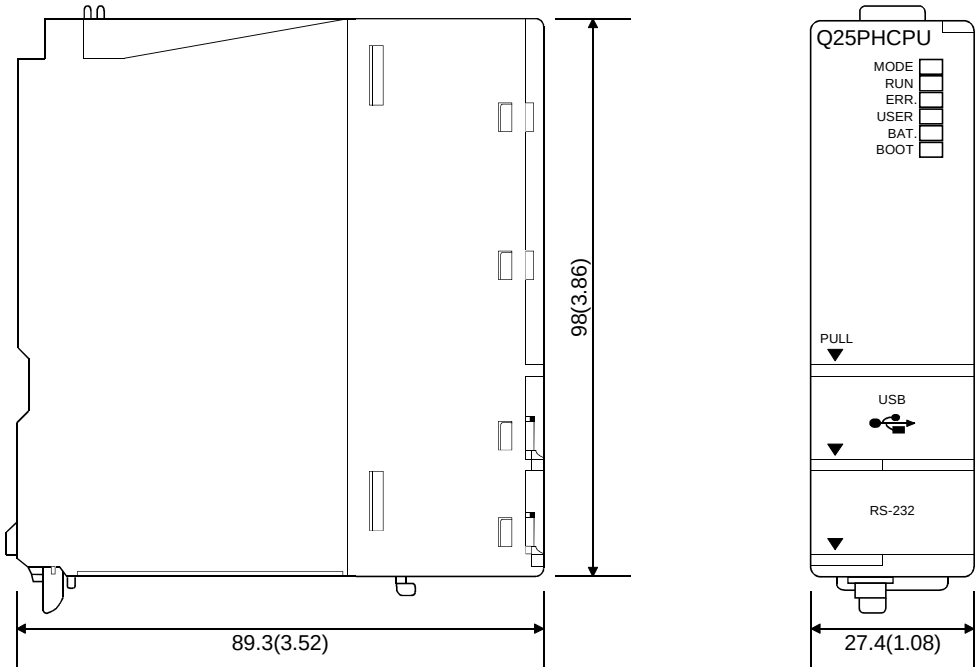
# APPENDIX 2 External Dimensions Diagram

## APPENDIX 2.1 CPU module




Unit: mm (inch)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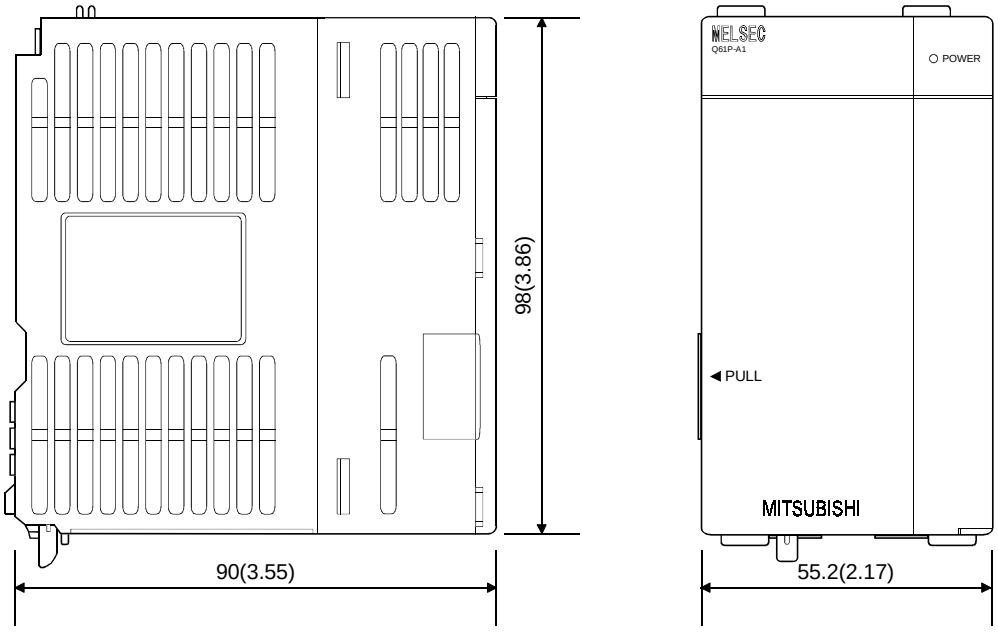
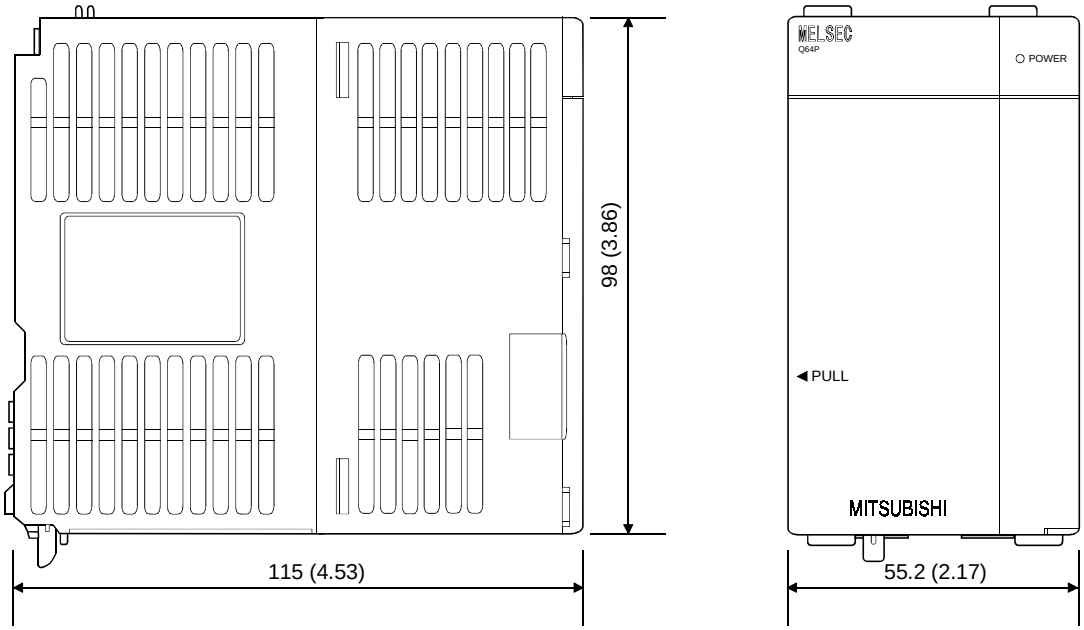
## APPENDIX 2.2 Power supply module

### (1) Power Supply Module (Q61P-A1, Q61P-A2, Q62P. Q63P)




Unit: mm (inch)

### (2) Power Supply Module (Q64P)




Unit: mm (inch)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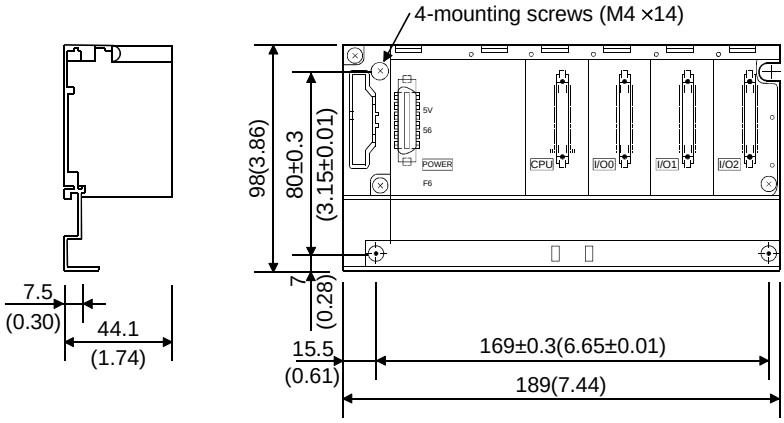
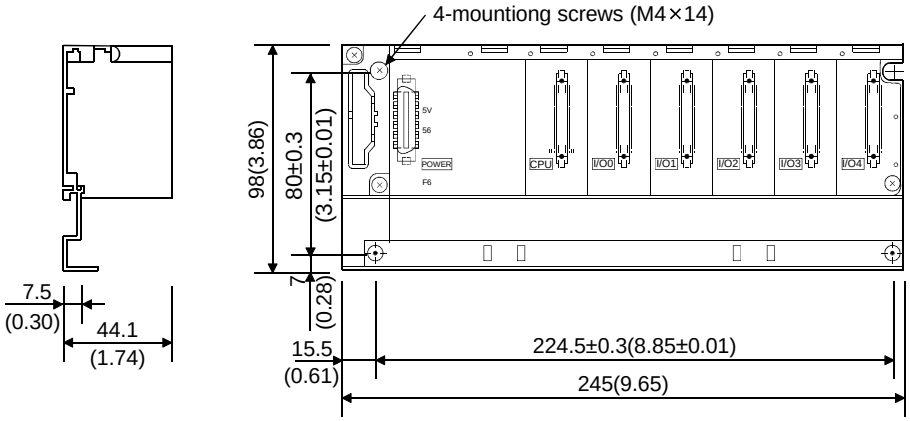
## APPENDIX 2.3 Main base unit

### (1) Main Base Unit (Q33B)



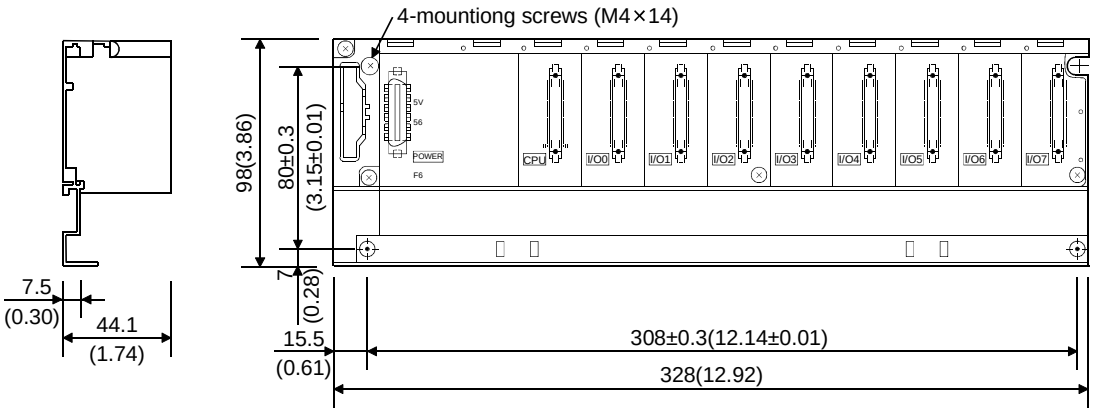

Unit: mm (inch)

### (2) Main Base Unit (Q35B)



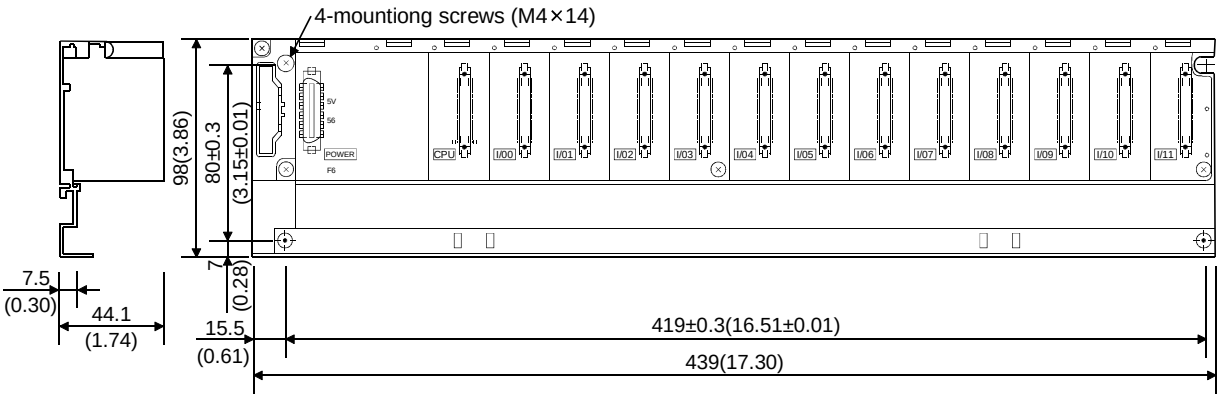

Unit: mm (inch)

### (3) Main Base Unit (Q38B)




Unit: mm (inch)

## (4) Main Base Unit (Q312B)




Unit: mm (inch)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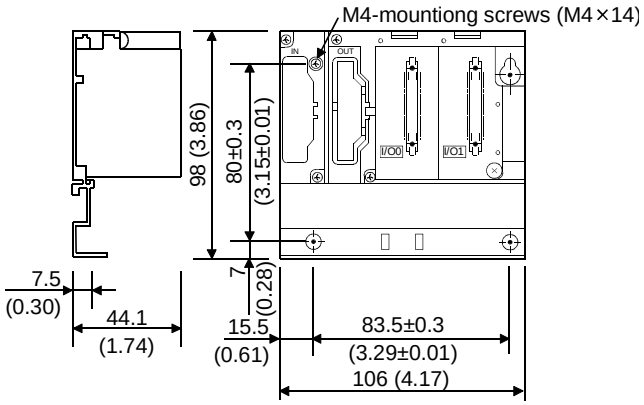
## APPENDIX 2.4 Extension base unit

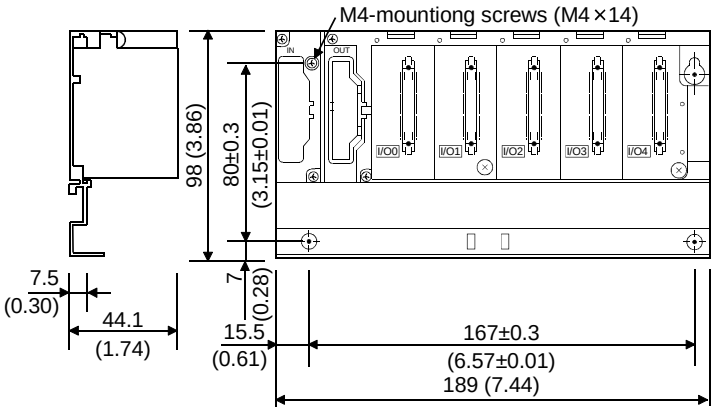
Unit: mm (inch)

### (1) Extension Base Unit (Q52B)



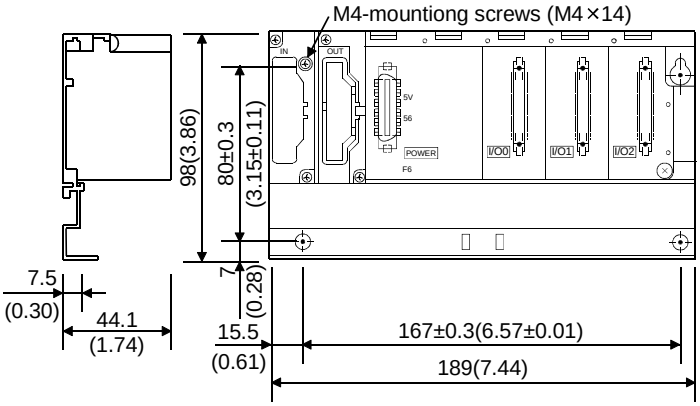

Unit: mm (inch)

### (2) Extension Base Unit (Q55B)




Unit: mm (inch)

### (3) Extension Base Unit (Q63B)




Unit: mm (inch)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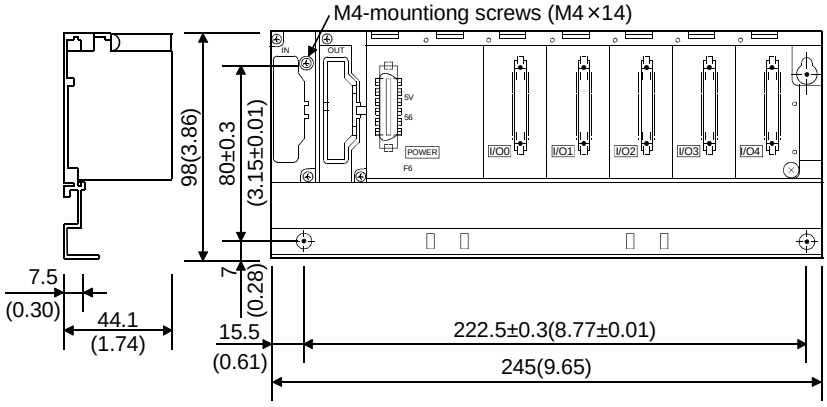
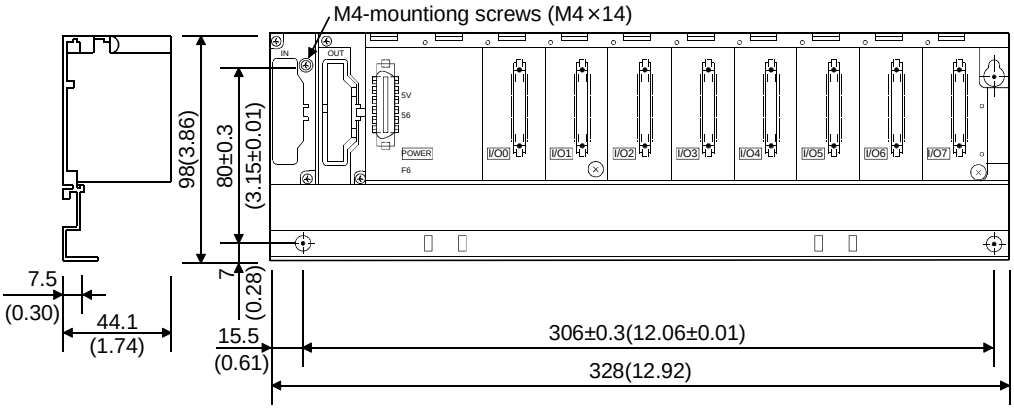
(4) Extension Base Unit (Q65B)



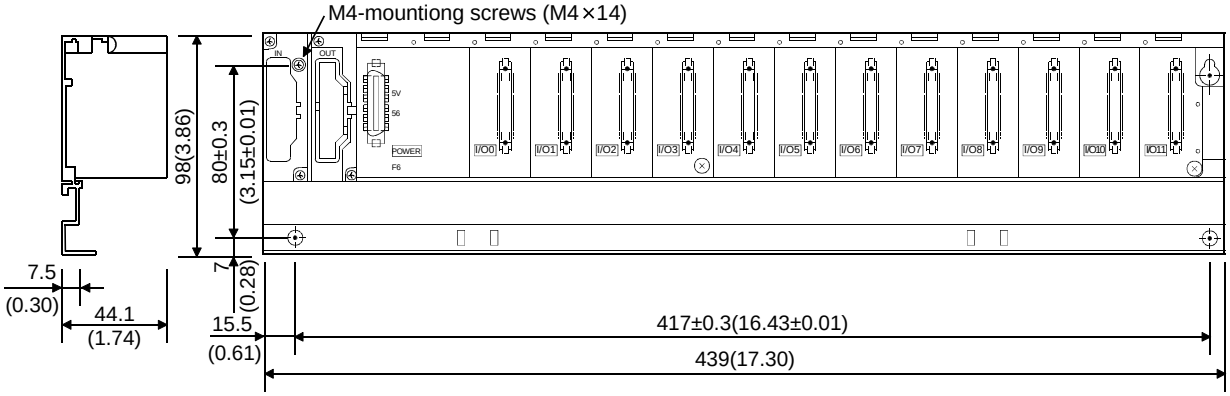

Unit: mm (inch)

(5) Extension Base Unit (Q68B)




Unit: mm (inch)

(6) Extension Base Unit (Q612B)




Unit: mm (inch)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# APPENDIX 3 Comparison between Process CPU and High Performance model QCPU

The comparison between the Process CPU and High Performance model QCPU is given below.

## APPENDIX 3.1 Function comparison

| Added Function | Process CPU | Function Version and Serial Number of High Performance model QCPU | | | | |
|---|---|---|---|---|---|---|
| | | Function Version A | | Function Version B | | |
| | | 02091 or earlier | 02092 or later | —— | 03051 or later | 04012 or later |
| Automatic write to standard ROM | ○ | × | ○ | ○ | ○ | ○ |
| Enforced ON/OFF for external I/O | ○ | × | ○ | ○ | ○ | ○ |
| Remote password setting | ○ | × | ○ | ○ | ○ | ○ |
| Compatibility with MELSECNET/H remote I/O network | ○ | × | ○ | ○ | ○ | ○ |
| Interrupt module (QI60) compatibility | ○ | × | ○ | ○ | ○ | ○ |
| Compatibility with the multiple PLC system | ○ | × | × | ○ | ○ | ○ |
| Installation of PC CPU module into the multiple PLC system | ○ | × | × | × | ○ | ○ |
| High speed interrupt | × | × | × | × | × | ○ |
| Compatibility with index modification for module designation of dedicated instruction | × | × | × | × | × | ○ |
| Selection of refresh item for COM instruction | × | × | × | × | × | ○ |
| Process control instructions | ○ | × | × | × | × | × |
| Online module change | ○ | × | × | × | × | × |
| MELSECNET/H multiplex remote I/O system | ○ | × | × | × | × | × |

○: Available, ×: N/A


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# WARRANTY

Please confirm the following product warranty details before starting use.

## 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

### [Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or the user.

## 2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not possible after production is discontinued.

## 3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

## 4. Exclusion of chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

## 5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

## 6. Product application

(1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

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